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The World's Greatest Building Paper

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PITTSBURG PLATE GLASS CO.

MANUFACTURERS AND JOBBERS OF

Plain and Beveled Mirrors, Bent Glass, Polished Plate for Desk and Table Tops

The Home of the Celebrated

Patton's Sun Proof Paints

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FACTS AND FIGURES

A Simple Problem in Arithmetic

A SOLUTION WHICH IS OF INTEREST TO YOU

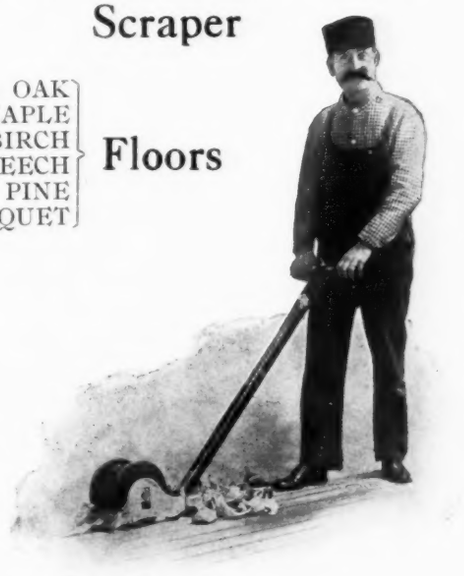
The Old Way

One man will scrape, by hand, about two squares, or two hundred square feet of flooring, in eight hours. The wage scale for this is from 40 cents to 55 cents per hour, or from $3.20 to $4.40 for 200 square feet, which is $1.60 to $2.20 per square.

The "Little Giant" Floor Scraper

FOR OAK
MAPLE
BIRCH
BEECH
YELLOW PINE
PARQUET
} Floors

Scrapes every inch of floor, into corners and along baseboard



The New Way

One man with a "LITTLE GIANT" FLOOR SCRAPER will scrape eight squares, or 800 square feet of flooring, in eight hours, which at the wage scale of from 40 cents to 55 cents per hour, would be 40 cents to 55 cents per square.

PAYS FOR ITSELF IN A FEW DAYS

SAVING

A saving is therefore made of from $1.20 to $1.65 per square. On 5,000 square feet (50 squares), the saving will be from $60.00 to $82.50, which at the lowest wage scale practically pays for the machine.

We furnish one dozen knives with each machine, and they will scrape 30,000 square feet of flooring.

New knives cost $6.00 per dozen.

SOLD UNDER OUR GUARANTEE TO DO BETTER, FASTER AND CHEAPER WORK THAN ANY OTHER METHOD

Price Complete . . F. O. B. Chicago or New York **$65.00**

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Modern ELECTRIC, BELT and HAND POWER

For PASSENGER or FREIGHT SERVICE in Factories, Stores and Dwelling Houses

Our Elevators are noted for their Easy Running and Serviceable Qualities

Don't Fail to Get Our Prices *When writing, State Your Requirements*

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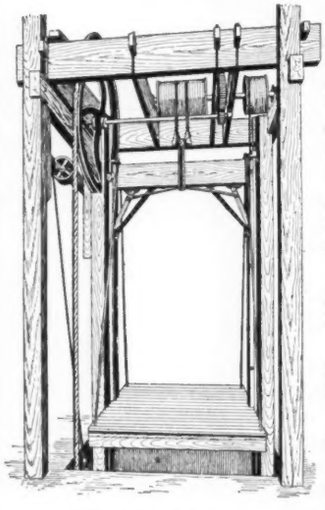
Shipped Direct to You F. O. B. Your City

All Parts Inter-Changeable



The annexed cut shows our standard type **Center Lift Hand Elevator,** the safest and most economical on the market; does not **drag to one side** or bind on guides.

Controlled by Screw Brake, (our own patent)- Noiseless Wooden Brake Shoes.

Use of Roller Bearings secures scarcely **no friction** in operation.

This Elevator is shipped K. D. with full directions for assembling.

You can install it at **no** expense to yourself except the help of the average mechanic or handyman.

Buy direct of the makers and save the middleman's profit. Ask for catalogue No. 99.

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THE STORM MANUFACTURING CO.

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New York Safety, Paragon (automatic lock) Manhattan, Newark;

HAND ELEVATORS

Paragon, Humphrey

TRUNK AND INVALID LIFTS

FOR ALL KINDS AND CLASSES OF WORK

All Machines Guaranteed

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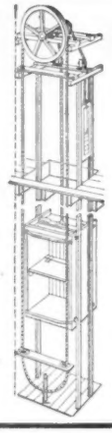
The "COLUMBIA" or "JUMPER" always leads. Shall we send you descriptive matter that tells all about them?

HAND and POWER **ELEVATORS**

SIDE-WALK or CELLAR **HOISTS**

J. G. SPEIDEL

Send for Catalogue "A" READING, PENNA.



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Of Latest Design and Most Improved Construction

Carriage Elevators,
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Carriage Hoists **Sidewalk Hoists**
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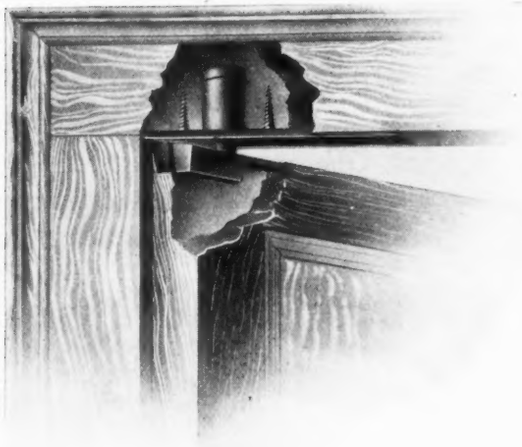

¶ The Columbian Floor Spring Hinge is practically invisible. The small shallow spring bearing box (to left below) sets into floor, and only the handsomely finished top plate is visible.

¶ Just another word about that shallow box. It is just the depth of the usual double floor($1\frac{3}{4}$ in.), which means that it may rest on a joist or I-beam and be exactly flush with floor surface.

¶ Note that the parts which set into the door itself are small and absolutely invisible.

¶ No weakening or disfiguring of door by side plates. When House Cleaning time comes around if you desire to take down door hung on a

Columbian Floor Spring Hinge

simply insert a knife blade or any thin tool handy in slot in door part (shown above). Then raise the loose top pivot held in place by a spring, and the door may be removed instantly without disturbing the hinge or its tension.

¶ This feature makes the Columbian also the easiest to install, and the tension may be adjusted easily without removing the hinge after it is in place.

¶ All working parts are protected against dirt and moisture.

¶ The ball-bearing feature makes it a noiseless, smoothly working hinge.

¶ And as it is simple and compact, long and satisfactory service is assured.

¶ We guarantee the hinge in every particular, and forty-seven years of experience manufacturing spring hinges backs up our guarantee.

¶ Here's a chance to get acquainted with a floor spring hinge which costs no more than inferior makes.

¶ Our free catalogue No. 12 will serve as an introduction to the "Columbian."

¶ Drop a postal today.

THE COLUMBIAN HARDWARE CO.

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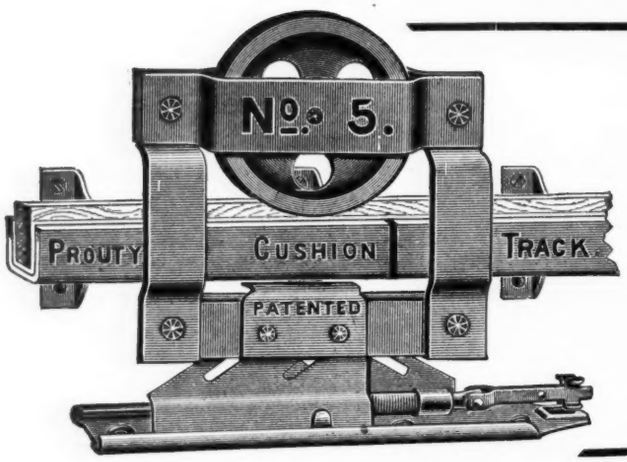

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Time is money to all busy men, and you can save hours by using **Prouty Parlor Door Hangers.**

The PROUTY No. 5 CUSHION TRACK HANGER does not require any cutting of the door, and our adjustment is positive, so when once in place it **never** requires further attention. It is **noiseless, easy-running and strong,** and if you use it once you will have no other.

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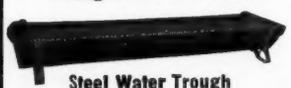
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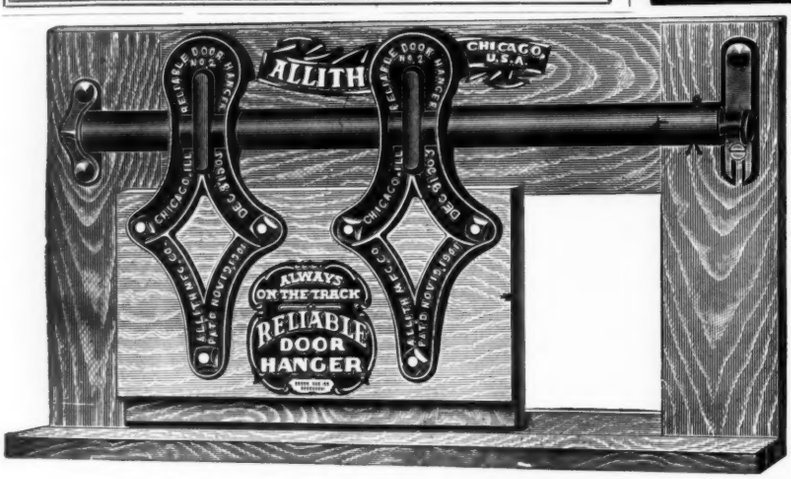

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ROUND TRACK DOOR HANGERS

Impossible to Derail
Easy Running, Great Strength

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In quality, style and beauty of finish our Automatic Boring Tools cannot be matched. The improved chuck now put on these tools is absolutely positive and quick working.

The drill points provided are so constructed that it is utterly impossible to pull them out of the chuck without first loosening the jaws. Send for catalogue "C," which illustrates and describes all of our different patterns.

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The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up-to-date mechanic could buy tools of their quality and character.

Other tools are very good tools but "Yankee" tools are better.

"Yankee" tools are sold by all leading dealers in tools and hardware everywhere. Ask your dealer to see them.

Our "Yankee" Tool Book tells all about these and some others, and is mailed free on application to—

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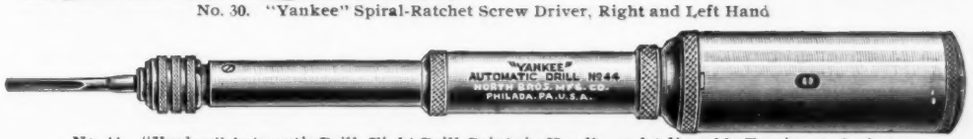

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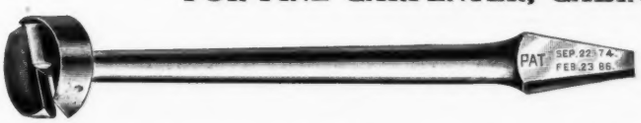
FOR FINE CARPENTER, CABINET AND PATTERN WORK



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To thoroughly introduce this high grade tool among carpenters, pattern makers and others, we will mail to any reader of the AMERICAN CARPENTER AND BUILDER upon receipt of 50 cents any bit we make from one-quarter inch to one inch in size.

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All-Steel Sash Pulleys

Are sold DIRECT to Builders, Contractors and Mills at prices under the common ordinary goods

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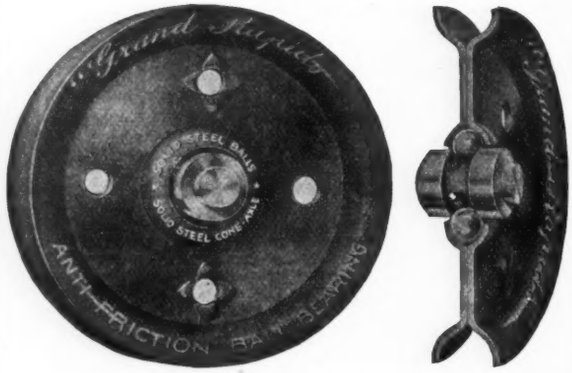

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.
Write for catalog and free samples and prices on half-gross, gross, barrel, or any quantity. Direct from the makers to you. Inquiries welcome.

Grand Rapids Hardware Co.
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and see that he gives it to you. It is impossible to

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will wear so much longer than ordinary rough cords that it is by far the most economical

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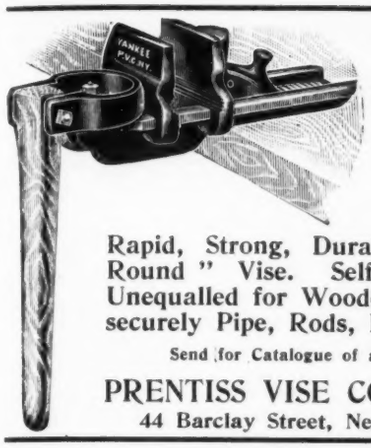

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Steel bar any length desired.
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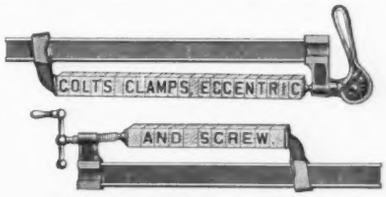

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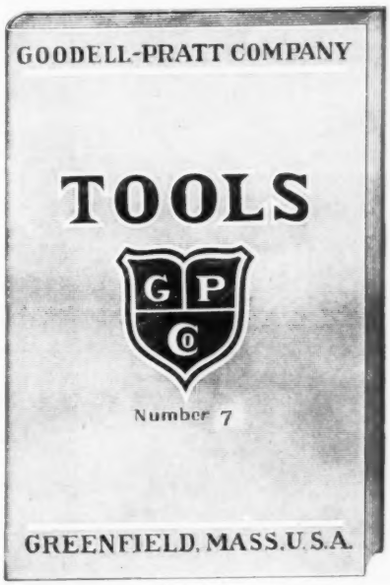

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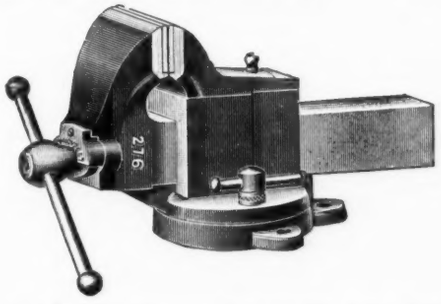

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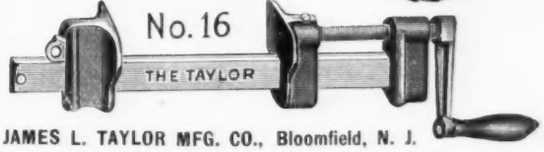

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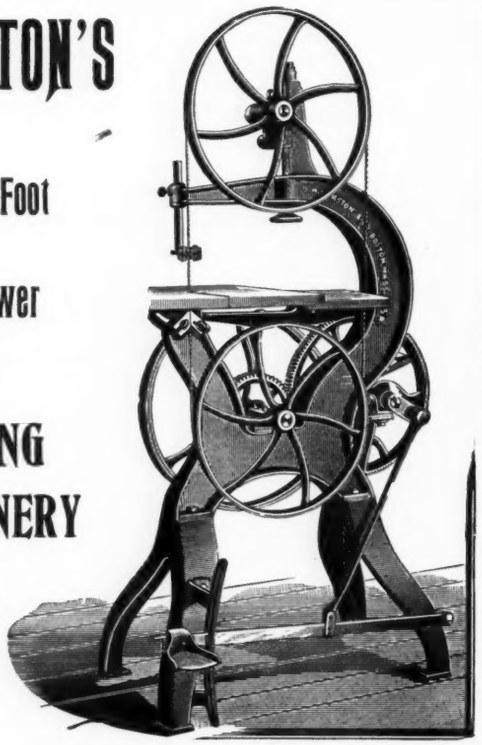
WOOD WORKING MACHINERY



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IF YOU ONLY KNEW HOW GOOD IT IS YOU WOULD HAVE

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ANVIL—Full Size

The upper handle clamps the Saw against the side of the Anvil so it cannot slip. The lower handle sets the tooth by forcing it against the face of the Anvil. The setting is changed by turning the Anvil, which has 10 numbered faces. Any setting may be returned to by using again the same face.

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"Hints on the Care of the Saw" will be sent free on application

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Made to outwear the ordinary Screw Drivers now made. Are made of Bo-ras-ic steel, toughest meta known, and will never turn in the handle, as their name implies.

Catalogue of Carpenter's Tools Free upon request.

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Will grind all kinds of edged tools, polish silverware and run sewing machines, 1000 other uses.

Guaranteed to give more power than any other Faucet water motor. **Price $4.00.** **$3.50** and this ad. will get a 4 inch motor. **Our 6 inch motor** for heavy purposes, **$12.00.**

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Send 16 cents for samples and our special circular 182 J.

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FLY SCREENS

Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of screens.

For outside screens we use the identical finish of the outside of Pullman cars.

The best grades of Wire Cloth, enameled, galvanized, genuine bronze, etc. Fastened by tacks or by the "lock-strip" process.

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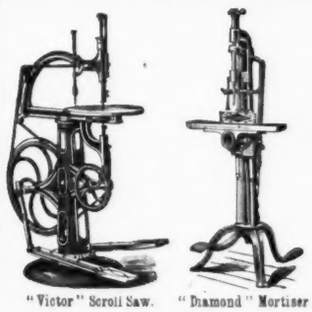
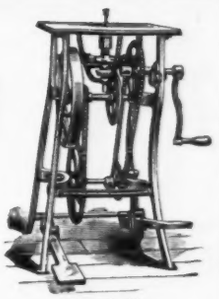
WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers, and Other Wood-Workers

BUILT FOR HARD WORK, ACCURATE WORK AND LONG SERVICE



"Victor" Scroll Saw. "Diamond" Mortiser



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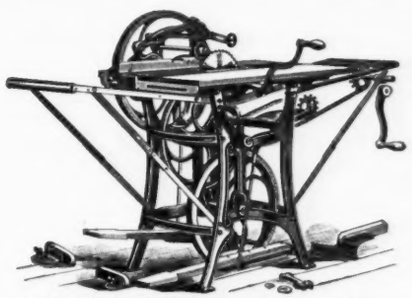

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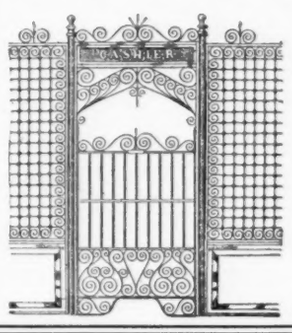

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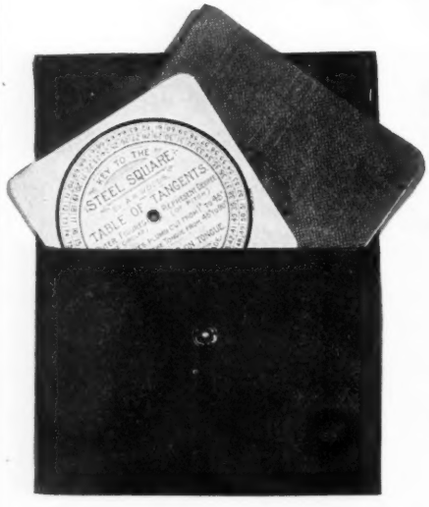

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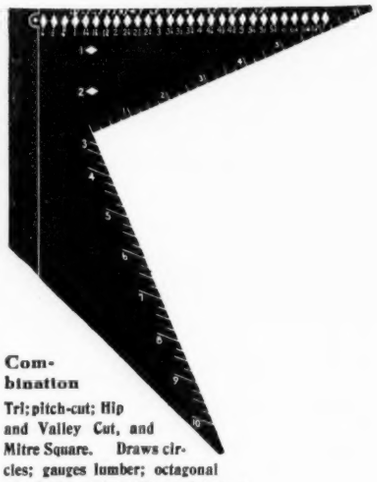

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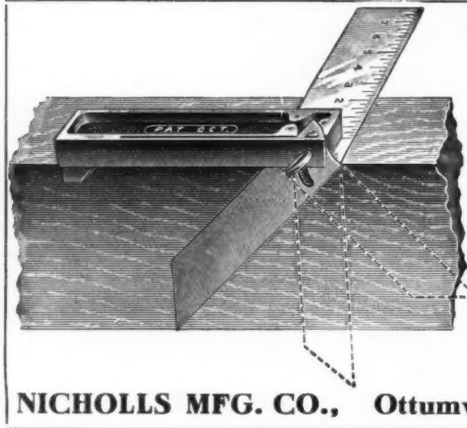

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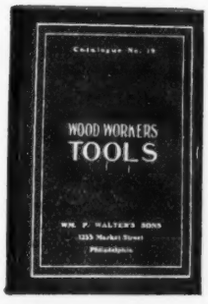

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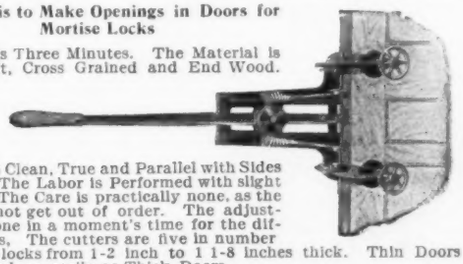

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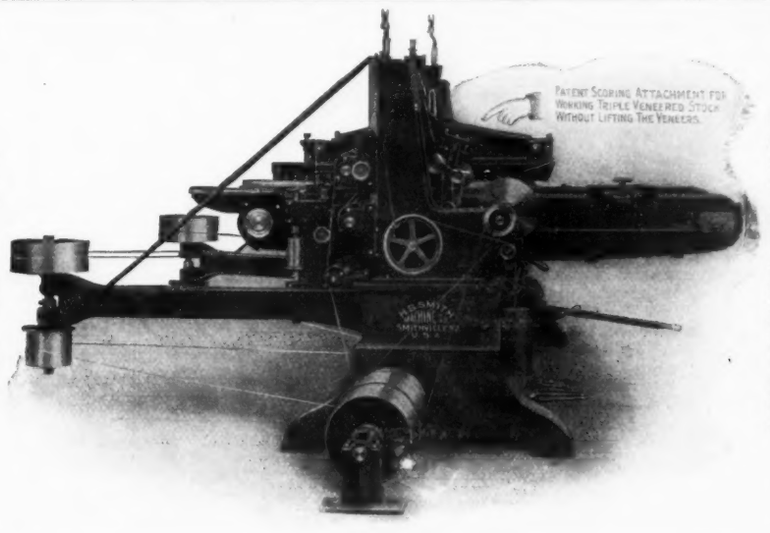

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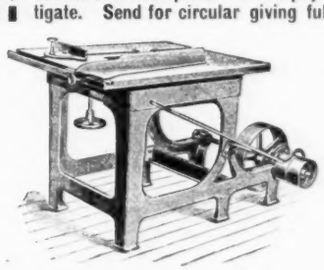

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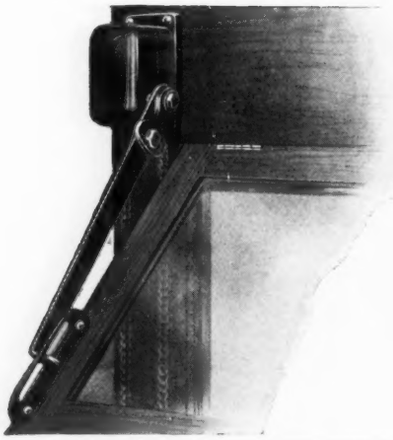

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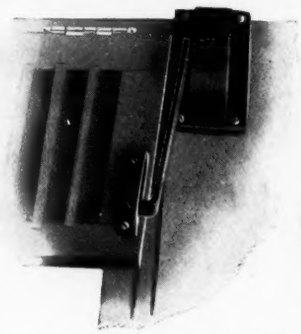

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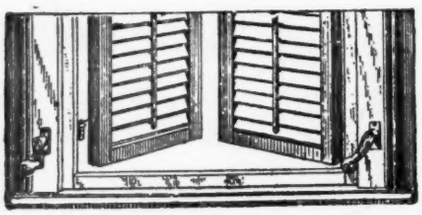

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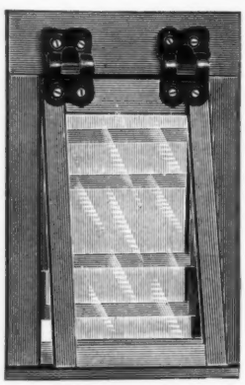

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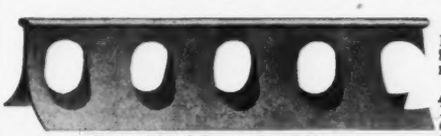

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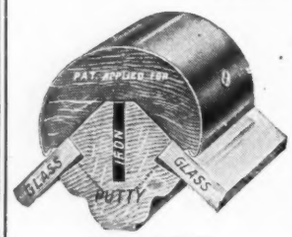

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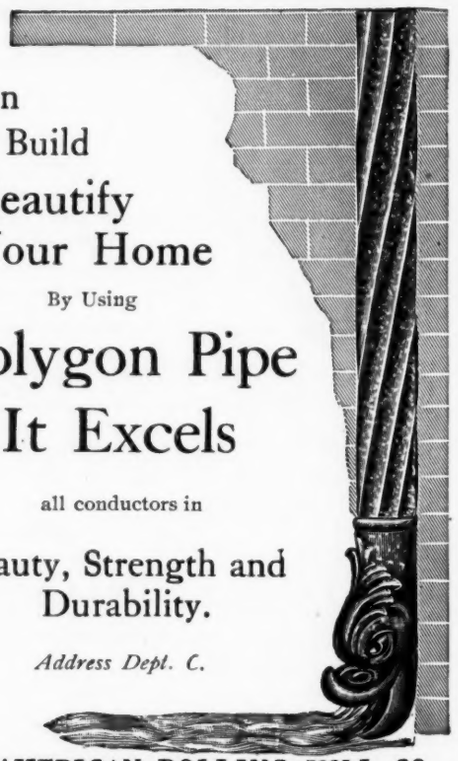

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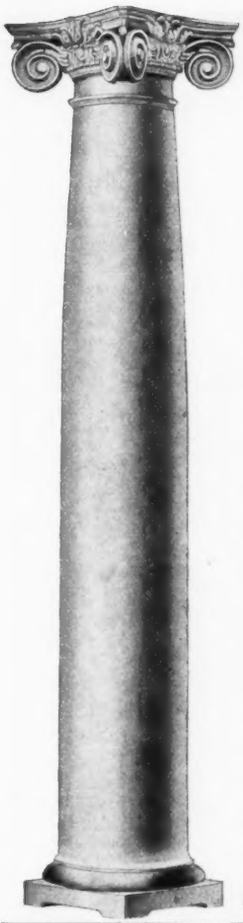

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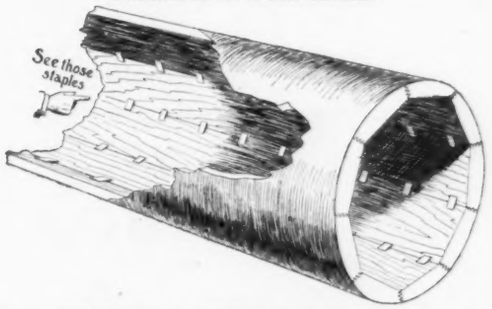

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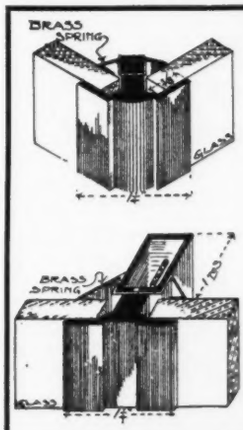

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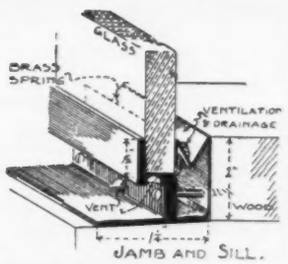

(This setting goes all around the glass.)

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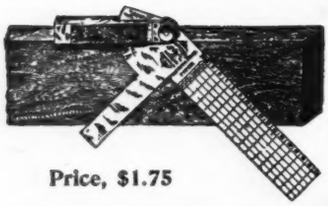

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IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

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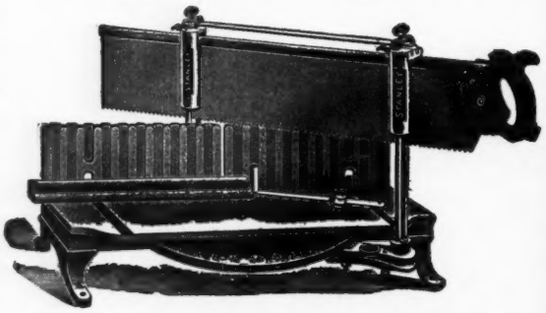

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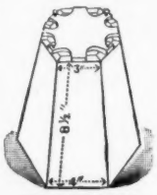

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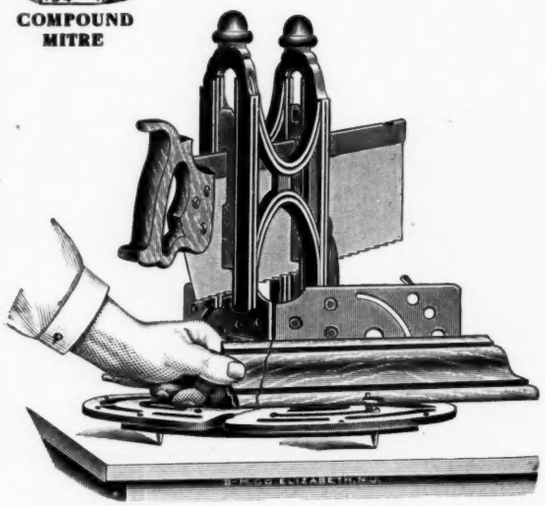

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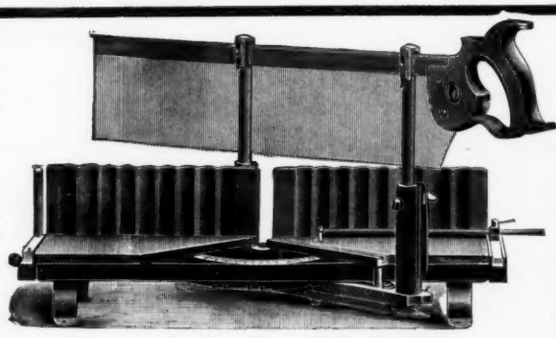

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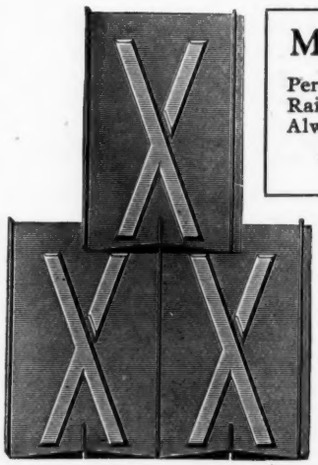

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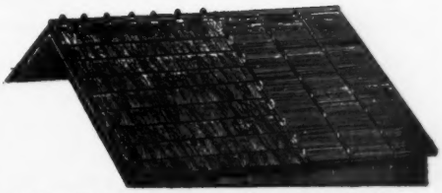

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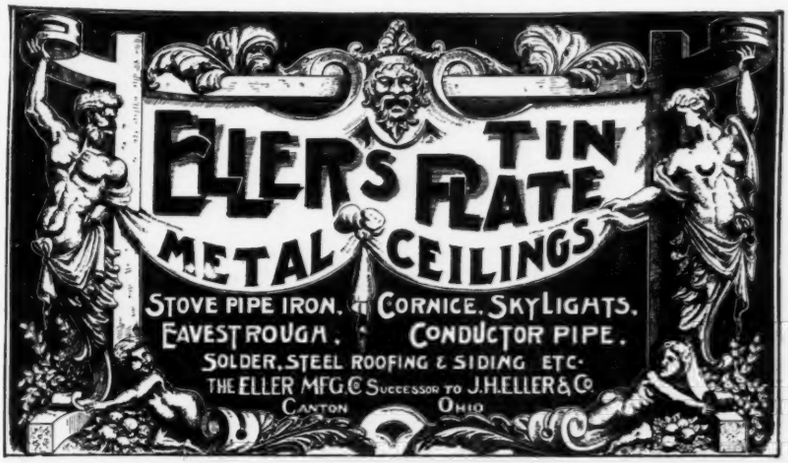
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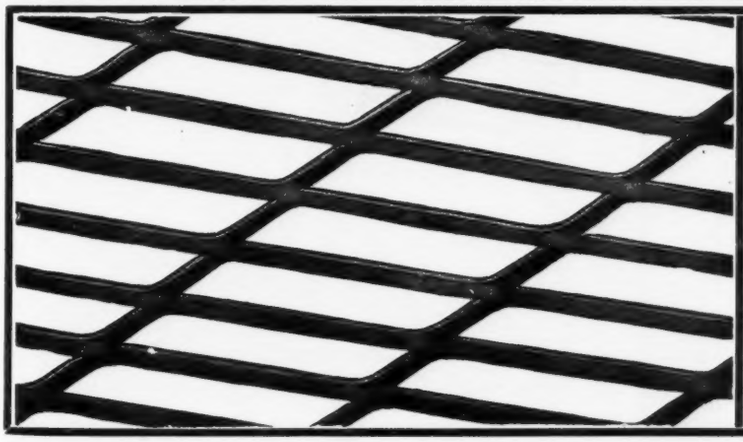

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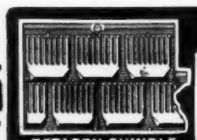

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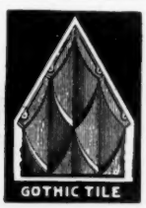

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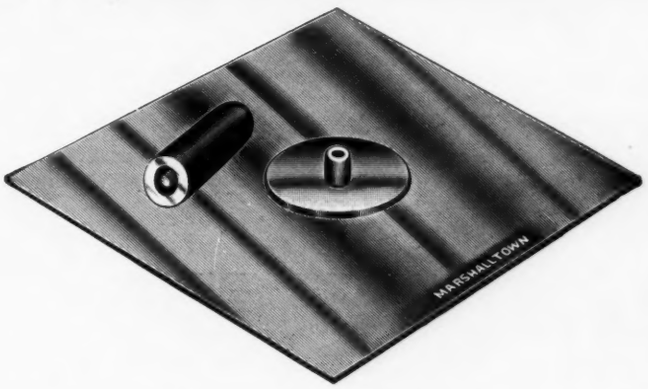

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For other information see this paper for May at page 150, July page 399 or write to **GAGE TOOL CO., Vineland, N. J.**

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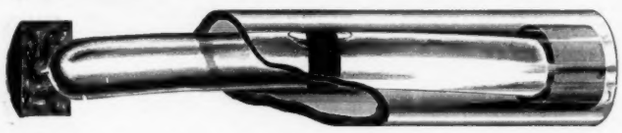

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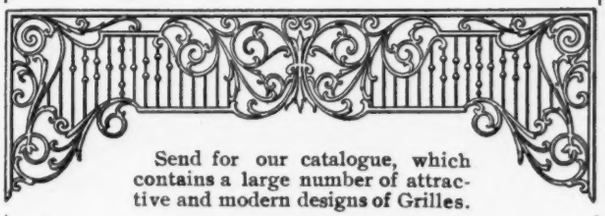

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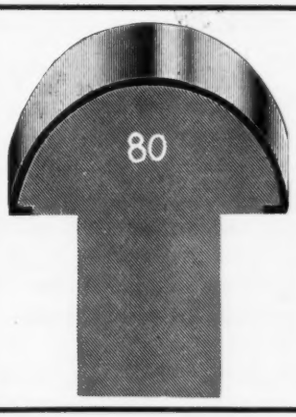

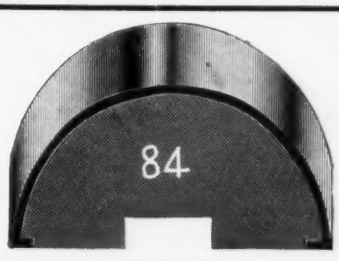

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American Carpenter and Builder

Entered as second-class matter July 1, 1905, at the postoffice at Chicago, Ill under the Act of Congress of March 3, 1879.

WILLIAM A. RADFORD, EDITOR.
WILLIAM REUTHER, ASSOCIATE EDITOR.

Published monthly by

American Carpenter and Builder Company
196 FIFTH AVENUE, CHICAGO.
O. F. BYXBEE, General Manager.
E. L. HATFIELD, Assistant Manager.

VOL. II. AUGUST, 1906 No. 5

The AMERICAN CARPENTER AND BUILDER is issued promptly on the first of each month. It aims to furnish the latest and the most practical and authoritative information on all matters relating to the carpentry and building trades.
Short practical letters and articles on subjects pertaining to the carpentry and building trades are requested.

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✣

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✣

DON'T expect the time to come when everything will move along just as smoothly as you desire, for you will surely be disappointed if you do. We are told there is a place where this may be expected, but we must die before we can prove it.

✣

The Barometer of Trade

FROM the reports coming from all the large corporations of the country we have every reason to believe that the year 1907 will be even more prosperous than the present one. A great many orders are already in for the coming year, which means a great activity in the building line. From the West comes the report of large crops, and in all manufacturing lines the maximum capacity will be maintained. This is good news to the carpenter and builder, for his prosperity depends upon the general progress and prosperity of the country.

✣

Radical Change Necessary

WHEN this great country of ours is spoken of as "that land of sudden calamities" by foreign papers, it behooves us to investigate and see how far they are justified in their statements. We have been so accustomed to thinking our country so much greater than any other that such a statement naturally produces somewhat of a shock.

Looking over the statistics for the past five years shows that the annual fire loss in the United States has been $2.50 per capita as compared with $0.33 per capita in the larger European countries. During the last ten years the total fire losses in the United States amounted to $1,250,000,000. As these are the facts in the case, the question arises, what can we do to remedy this deplorable state of conditions? Two radical changes are necessary: First, a revision of our building laws, and, second, a more accurate and thorough knowledge concerning the strength, fire-resistance and other properties of building materials.

The old proverb that an ounce of prevention is worth a pound of cure might be aptly applied in this case.

✣

New Schools for Chicago

A LOAN of $10,000,000 is being planned by the board of education of the city of Chicago for the purpose of giving every child in the city a seat in a well-lighted, sanitary school building. They are beginning to realize that it is impossible for a child in a class of fifty to receive the proper attention to which he is justly entitled. Every child, especially in the lower grades, needs and should get more or less of the individual attention of the teacher, as it takes away the feeling of being lost in the crowd, which often discourages the small child. Another feature which will be remedied is the unhealthy condition, which is the natural result of a crowded school room. It is only at church fairs or when listening to election returns that the parents of these children are in the same atmosphere, and then it is the excitement of the moment that makes them tolerate it. But these small children who, with their undeveloped bodies, should have all the fresh air they can possibly get, are crowded in groups of fifty and sixty into a room that should only accommodate not more than thirty-five. These conditions will be remedied in the city of Chicago now that the members of the board of education are familiar with the existing conditions. It would be wise for other school boards to look into their school rooms from time to time, and they would no doubt find that Chicago is not the only city where changes for the betterment of the schools could be made.

CARPENTER and BUILDER AGENTS WANTED

DID YOU read "Short Talks With Our Subscribers" in the July issue? If not, we wish you would do so right now. It appeared on page 425.

It does not matter whether you are a regular subscriber or not — we want you for our agent. You may have very little spare time. It only takes a few minutes to earn a good income on the side.

Send at once for our liberal terms to agents. Get in the field before some enterprising fellow gets ahead of you.

Address your letter to
E. L. HATFIELD, Assistant Manager
American Carpenter and Builder
196 Fifth Avenue, Chicago

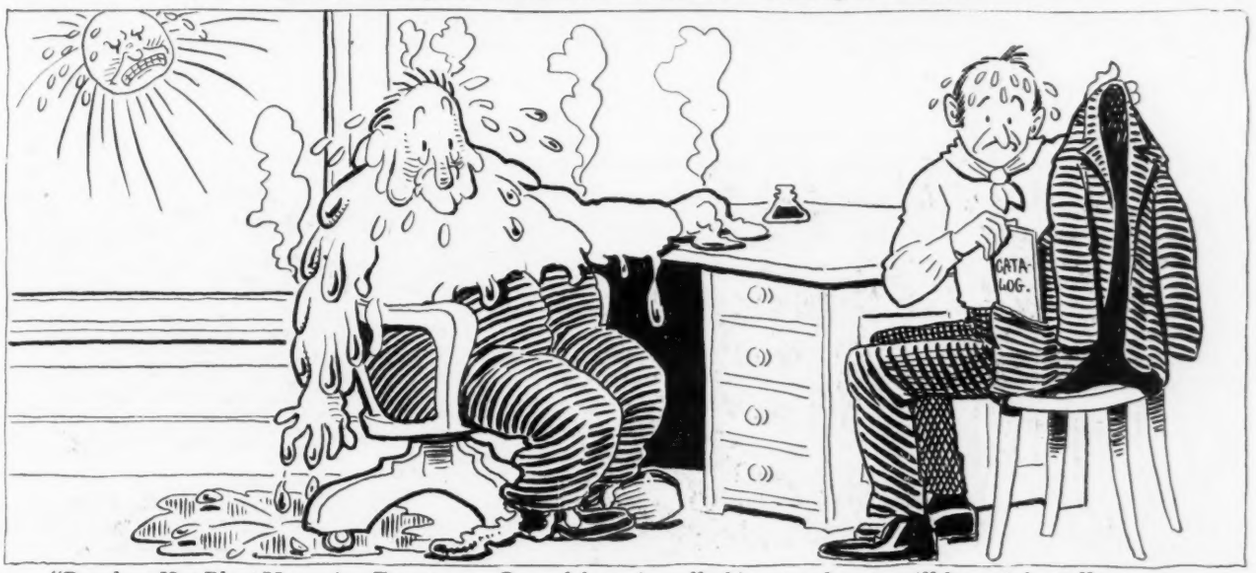
✣

Learning Trades in Schools

MANY of our young men who are attending schools ultimately intend to become mechanics of some kind. Some will become carpenters, others engineers, and so on through the various trades, each endeavoring to become a master in his particular line. The usual method of learning a trade is to be put to work doing odd jobs around the shop, and the boy is left alone except when asked to do something entirely foreign to the trade. He receives no individual attention, as every one is too busy to show him how and why certain things are done, and if he does not become discouraged altogether he will eventually pick up enough to pass for a finished workman. Would it not be a good idea to give the boys an opportunity in their school years to show what they are adapted for, instead of waiting until they are out of school and then make machinists out of them when their natural bent is toward carpentry or school teaching. He will never make a first class machinist, and by the time this is discovered he will be too old to become a first class carpenter. We have an instance in mind of a young man who was put into a machine shop to learn the trade, not because he showed any adaptability that way, but because the nieghbors thought it was a good trade. After swinging a sledge hammer in the blacksmith shop for six months he was put shoveling sand in the molding room. After becoming an adept with the shovel he decided that the machinist trade was not for him and he took up commercial work, in which line he is now successful. From handling the sledge hammer and the shovel to using the pencil and pen is quite a contrast, but there are hundreds of similar cases all over the country. Years are being wasted by our young men finding out what they are best suited for. In late years it has been found advisable to install a commercial system into our schools, and many are taking advantage of it and profiting thereby, but would it not be just as advisable to put in a trade course with a complete workshop? The manual training department in our various schools is a step in the right direction, but it is only a beginning to what is necessary in this age, when skilled mechanics are in such demand. Under a system of trade schools the boys would receive the individual attention of the instructors and a definite conclusion could be reached without consulting the neighbors. He would further get a better idea of the relation of things and develop an originality in his chosen line, which is hard for him under existing conditions.

The Furnace Man Loses a Prospective Customer

Caller—"Am I right in thinking you are Mr. Stubbs, who is building a new house? Ah, I thought so. This is a scorcher, isn't it? But winter is coming and I would like to show you some figures on our—



"Peerless Hot Blast Vesuvius Furnaces. One of these installed in your house will keep it hot all—

"Winter. Say! What happened to him?!!!!"

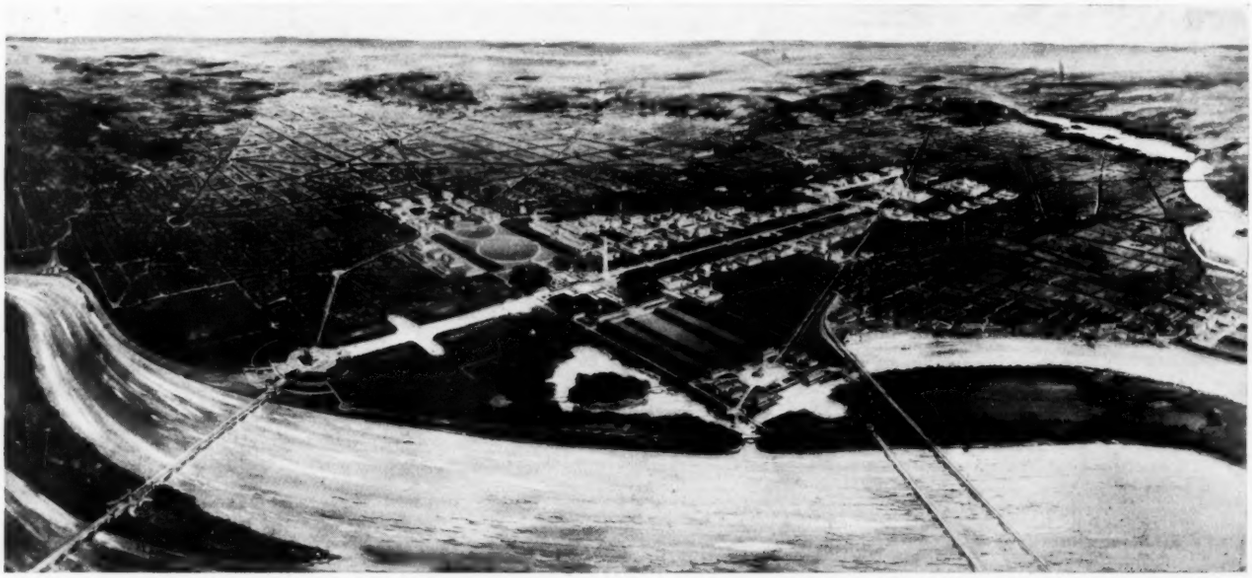
The Twentieth Century Washington

By Waldon Fawcett

DECIDEDLY the most interesting and most extensive project for civic improvement now in progress in the United States is the very ambitious scheme for transforming the capital of our nation into the "City Beautiful." Washington, which is at present acknowledgedly the most attractive city on the continent, has frequently been declared by enthusiastic admirers to surpass any urban community in Europe with the possible exception of Paris, but certain it is that the present attributes of the city on the Potomac will be inconsiderable in comparison with her charms when the present ambitious scheme shall have been fully carried out.

Moreover, this beautifying of Uncle Sam's seat of government is certain to prove so convincing an object lesson to other municipalities throughout the United States that the governmental enterprise may be expected to indirectly stimulate building activities in various sections of the republic. The present project for the improvement of Washington really had its origin with L'Enfant, the French architect, who first laid out the capital city under the direction of George Washington and Thomas Jefferson. A commission of eminent architects appointed a few years since by the Senate of the United States has elaborated this century-old scheme, but it still retains the features of axial relations and reciprocity of sight between public buildings which received the approval of the founders of the nation.

It should be explained just here perhaps that the national government has not as yet made the appropriations necessary to carry out this whole vast project which will involve the expenditure of millions of dollars, but all the new public buildings authorized or under construction in Washington—and these, in the aggregate involve an outlay of about $14,000,000—have been designed and located with reference to the ultimate fulfillment of this undertaking to make Washington the most beautiful of all the world's capital cities.



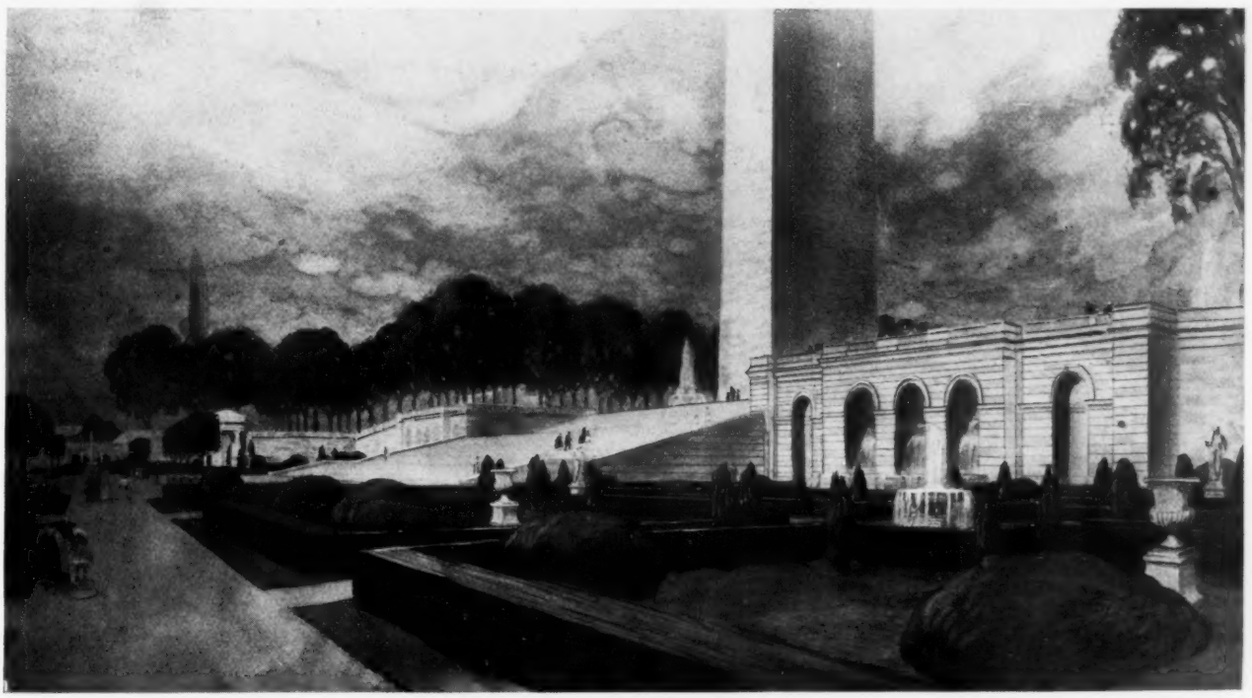
Birds Eye View of the Mall when Improved

Some of the main purposes of this vast architectural and building enterprise are to re-establish relations between the Capitol, the Washington Monument and the White House and to provide suitable and appropriately located homes for rapidly expanding branches of the public service not a few of which are now in inadequate rented quarters, but the scope of the enterprise also embraced pretentious schemes in landscape

Proposed Approach to Monument

architecture. For instance suitable connections are to be made between various outlying parks, new parks and recreation grounds are proposed in conformity with present day progressive ideas and there is provision for the complete reclamation of the Potomac flats, a low-lying district which was primarily responsible for the reputation which Washington once had as an unhealthy city.

Perhaps the most tangible evidence of the coming realization of the ideal Twentieth Century Washington is found in the present status of the magnificent new Union Station to be used by the seven railroads now entering Washington. The completion of this new Union Station will mean the removal of the unsightly and dangerous railroad tracks from the Mall, thus restoring to its intended uses the vast stretch of park, more than half a mile in width, extending from the Capitol to the White House. The new station which is located north of the U. S. Capitol, will be reached by the railroads, via tunnels, one of which passes under



View of Terrace and Approach to Monument

The Twentieth Century Washington

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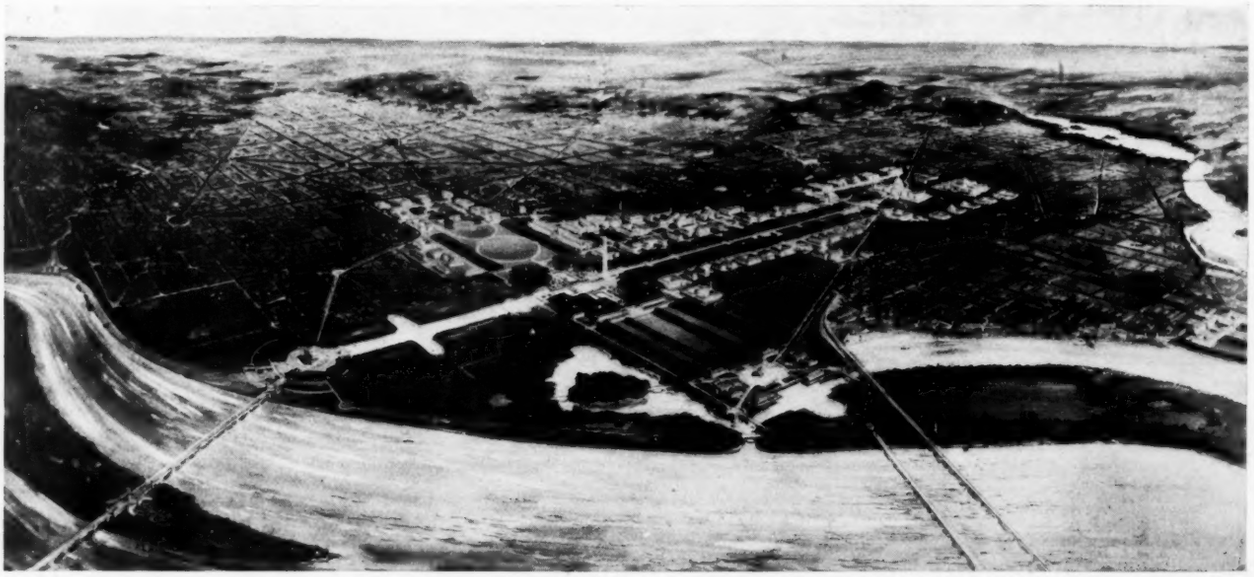

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Proposed Approach to Monument

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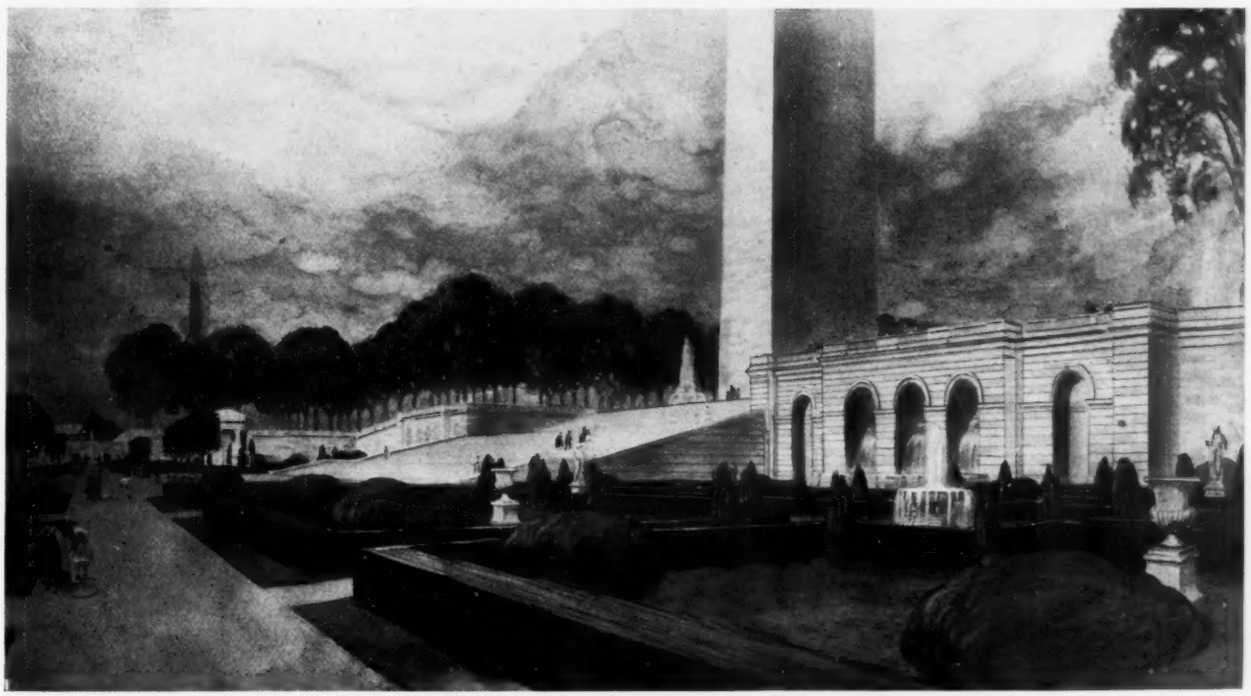
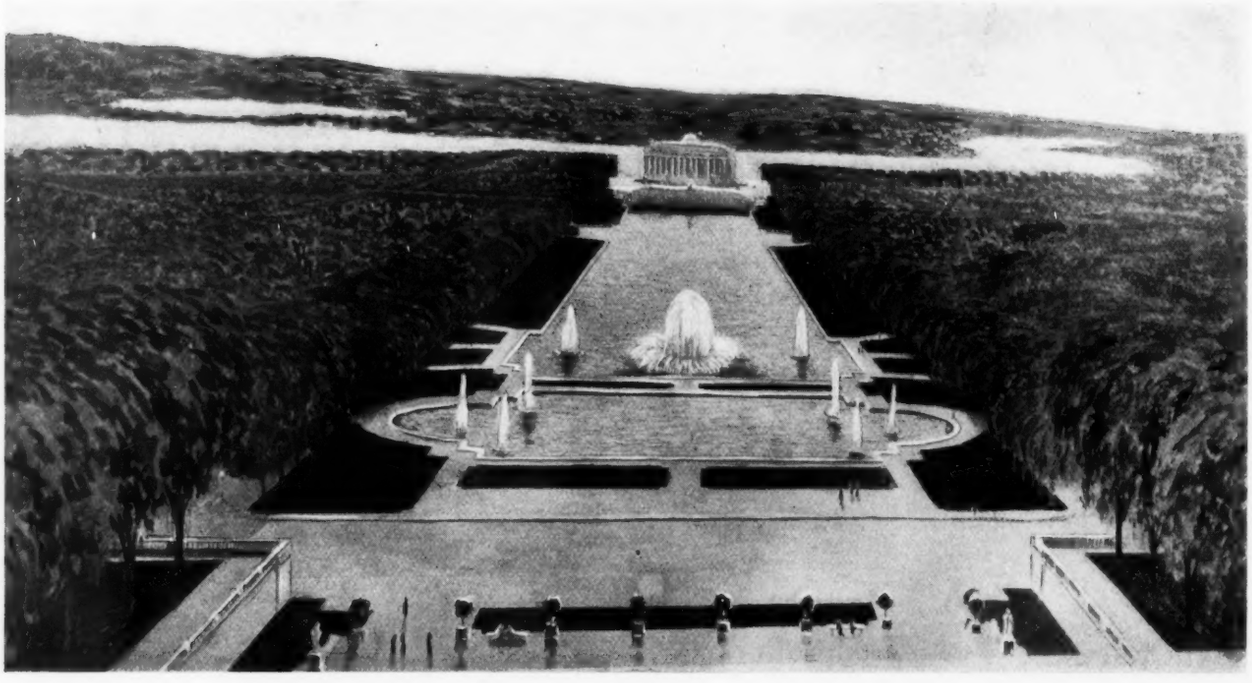


View of Terrace and Approach to Monument

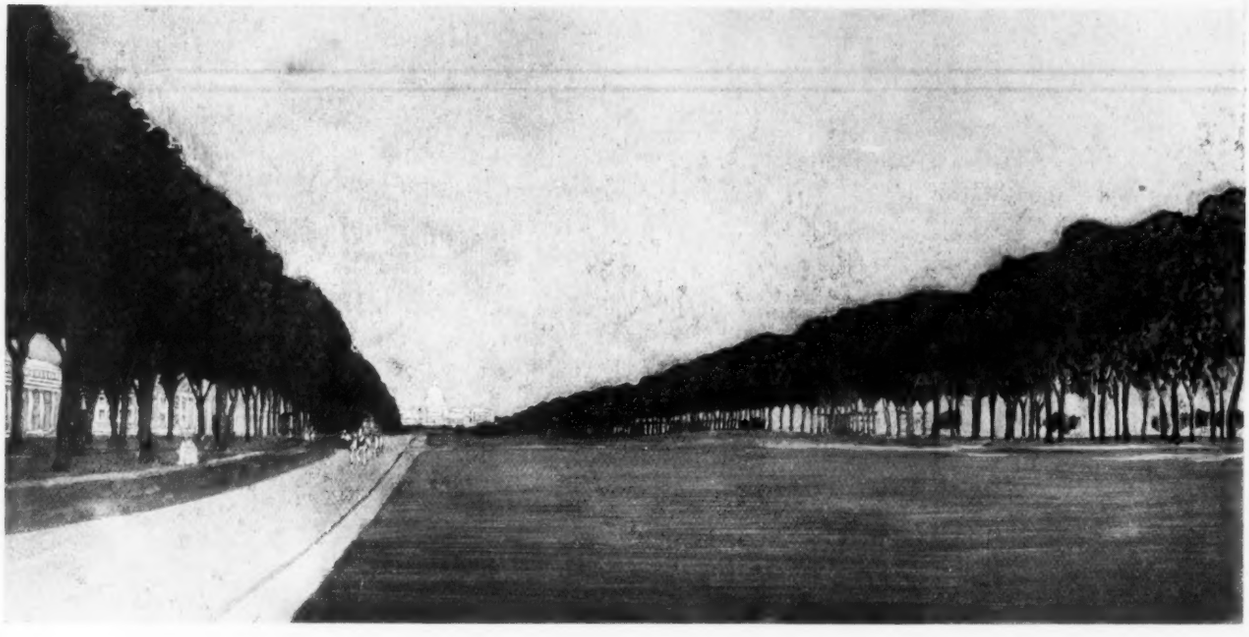


Looking from Washington Monument to Lincoln Memorial

the Capitol itself. The new station which will cost when completed more than $6,000,000 is being constructed largely of white marble in architectural conformity with the other public buildings of the capital city and will be a distinct ornament rather than a detriment to the appearance of the City Beautiful.

Another portion of this great civic improvement enterprise which has already come into being concerns the extension of the park system from the Washington National Monument to the Potomac River and the location on the banks of the latter, on the axis of the Capitol and Monument of a costly memorial to Abraham Lincoln. This latter, a Doric portico approached by a canal 3,200 feet in length and 200 feet broad has not as yet been appropriated for but Congress has already provided funds for the improvement of Potomac Park in which this memorial is to stand. Connecting the Lincoln Memorial with our greatest national cemetery, Arlington, on the Virginia side of the Potomac will be a Memorial Bridge.

After all, however, perhaps the best evidence of the excellence of the project for the improvement of Washington is found in the attested value of the symmetrical grouping of public buildings—a demonstra-



View of Mall when Improved

tion that is being taken to heart in many other American cities where municipal edifices are projected. The Commission that planned the new Washington proposed that all public buildings devoted to the scientific purposes of the government which shall henceforth be erected should be located flanking the Mall, on the north and south between the Capitol and the Washington Monument. This recommendation has been adopted and there is now under construction on one side of the Mall an imposing new home for the Department of Agriculture which will cost upward of $2,000,000 while on the opposite side of this unique parkway there is rising a new building for the National Museum which will represent fully as heavy an investment.

East of the Capitol is located the $6,000,000 Library of Congress, the most beautiful building in the world and it is proposed to erect on the adjoining square a home for the United States Supreme Court, which august tribunal is now allotted meager space in the Capitol building. Finally, reference must be made to the proposal for the expenditure of a couple of million dollars or more in the enlargement of the U. S. Capitol itself,—a building project that would increase the available space in the big building by fully one-third. This enlargement, if it is undertaken, as it no doubt will be at no distant date, will be carried out in accordance with tentative plans made by the architect who years ago designed the dome and the marble wings of the nation's legislative home. The enlargement would leave the wings as they are at present but would advance the eastern front of the main building to a point many feet beyond the present face of the structure. This extension would not only provide the additional room so sorely needed but it would give to the whole structure a much more symmetrical appearance and particularly would do away with the present top-heavy appearance of the dome due to the comparative narrowness of its base—an effect accentuated by the fact that the wings extend beyond the central portion of the building.

Largest Concrete Bridge in the World at Washington, D. C.

Another similarly effective grouping of buildings is in the making on Capitol Hill where the plans of the Commission ranged about the Capitol grounds a series of buildings bearing a common relation to legislative work. On one side of the Capitol building, but a square distant, there is now well on the way to completion a $4,000,000 white marble office building for the use of the members of the House of Representatives,—a stately structure which will provide a commodious office for each of the nigh four hundred members of the lower branch of the national legislature in addition to other needed rooms. Similarly located on the opposite side of the great white-domed building is an office building for the members of the United States Senate. Each of these supplementary structures will be connected with the Capitol by means of tunnels in which will be operated miniature electric railway systems.

Yet another feature of the project for the beautifying of Washington which the present summer will see fully realized is the construction of a War College and Engineers' School of Instruction on a point of land where the Anacostia River unites with the Potomac.

(*Continued on page* 551.)

J.A.F.Cardiff.

Building a Home

A SERIES OF ILLUSTRATED ARTICLES COVERING CONSTRUCTION DETAILS IN THE ERECTION OF OUR AMERICAN HOMES—FROM THE LAYING OF THE FOUNDATION TO THE DELIVERY OF THE HOUSE TO THE PAINTER

A DOUBLE-hung sash window in a brick wall, with inside folding blinds set in a projecting box, is made the subject of this issue.

The brick wall is thirteen inches thick and the opening is spanned on top by a stone lintel and has a stone sill cut with a wash on top, lugs at each end to receive the brick jambs, and drip or water nose on underside where it projects beyond the face of the wall.

The frame is set so as to give a four-inch reveal. The inner two-thirds of the opening is spanned by a timber lintel over which is turned a relieving arch of brick. Relieving arches usually consist of one rowlock arch for each eighteen inches or fraction thereof in the width of the masonry opening.

The inside blinds fold back in a pocket or box which is allowed to project into the room, rather than be made flush with the plaster wall. To make it flush would necessitate considerable furring of those walls of the room in which the windows occur and a consequent decrease in the size of the room. We are presuming in this case that it is desired to utilize all the space available for the room, and have consequently provided only the ordinary furring of one-inch by two-inch strips laid flatwise, and have allowed the blind box to project beyond the face of the plaster, treating it architecturally and making a feature of what is too frequently, from lack of a little forethought, an eyesore.

The open space under the window stool we have used to place a radiator and in the panel back we have placed a register through which the heat passes.

Fig. 136 is a section taken through the head of the window. The inside of the head has a wide soffit and a moulded entablature.

Fig. 137 is a section taken through the jamb of the window. When the blinds are folded back in the pocket, it has the appearance of a wide paneled jamb, owing to the fact that the first fold of the blinds has a panel instead of rolling slats. The second fold, however, has slats. The exposed faces of the box are covered with paneled pilasters which finish with a small base on the top of stool.

Fig. 138 is a section taken through the sill of the window, which finishes on the inside with a wide stool with a moulded edge. Edge should be returned against the wall at ends.

Advantage is taken of the open spaces under the stools to hide the radiators, which are more or less unsightly. For direct radiation, the radiator is simply placed within the box and a register provided in the face of the panel back, through which the heat passes.

A much better method of heating, when it is possible to place the radiators in the position described, is known as semi-direct heating and consists of the introduction of fresh air, from without the house, to the base of the radiator, from which point it passes up through the sections of the radiator, warming as it goes up, and out through the register to the room. The advantage of this method is that it provides ventilation for the room and supplies it with fresh warm air for heating; whereas, with the direct radiation, no ventilation is provided and the air that is warmed is that which is already within the room, and in most cases it is not very fresh.

A cast iron register, about the size of a brick, is provided in the face of the wall and connected with the base of the radiator by means of a small galvanized iron duct. The fresh cold air from outside the house enters through this passage and is controlled by means of a damper within the duct. In severely cold weather the damper may be closed entirely and the radiator used for direct radiation.

When radiators are boxed in as shown, they should be set within a galvanized iron box, or the stool, panel back and other surrounding woodwork should be lined with galvanized iron as a protection against fire.

Frequently the radiator is placed under the window stool, but not boxed in. In such a case the inside of the brick wall below the stool is furred and plastered two coats, scratch and brown, and a panel back provided immediately in front of plaster and behind the radiator. The stool, which is wide is supported on two wooden brackets, one under each pilaster, and about the same width as pilaster. This, however, is only for direct radiation. The underside of the stool should be covered with galvanized iron. The radiator, which is exposed in the room, should be neatly finished.

FIG. 136.

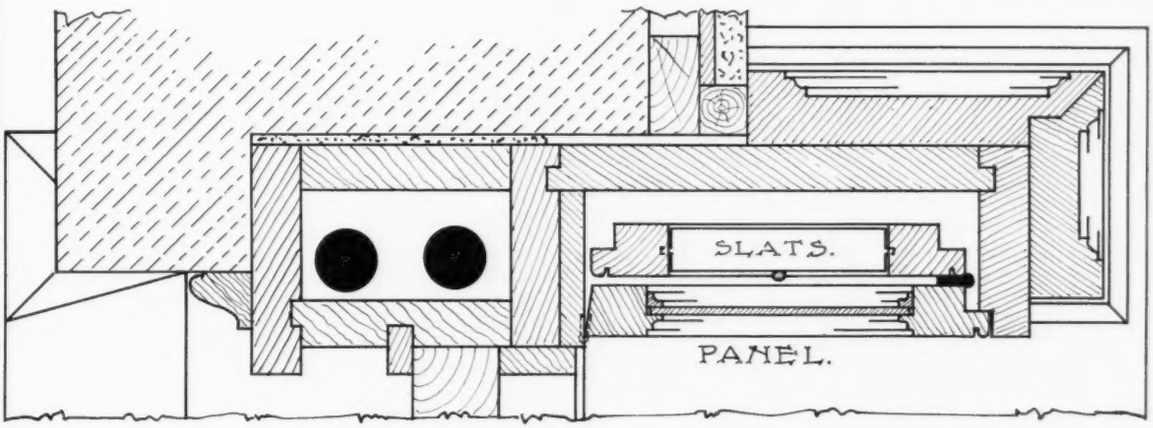


FIG. 137.

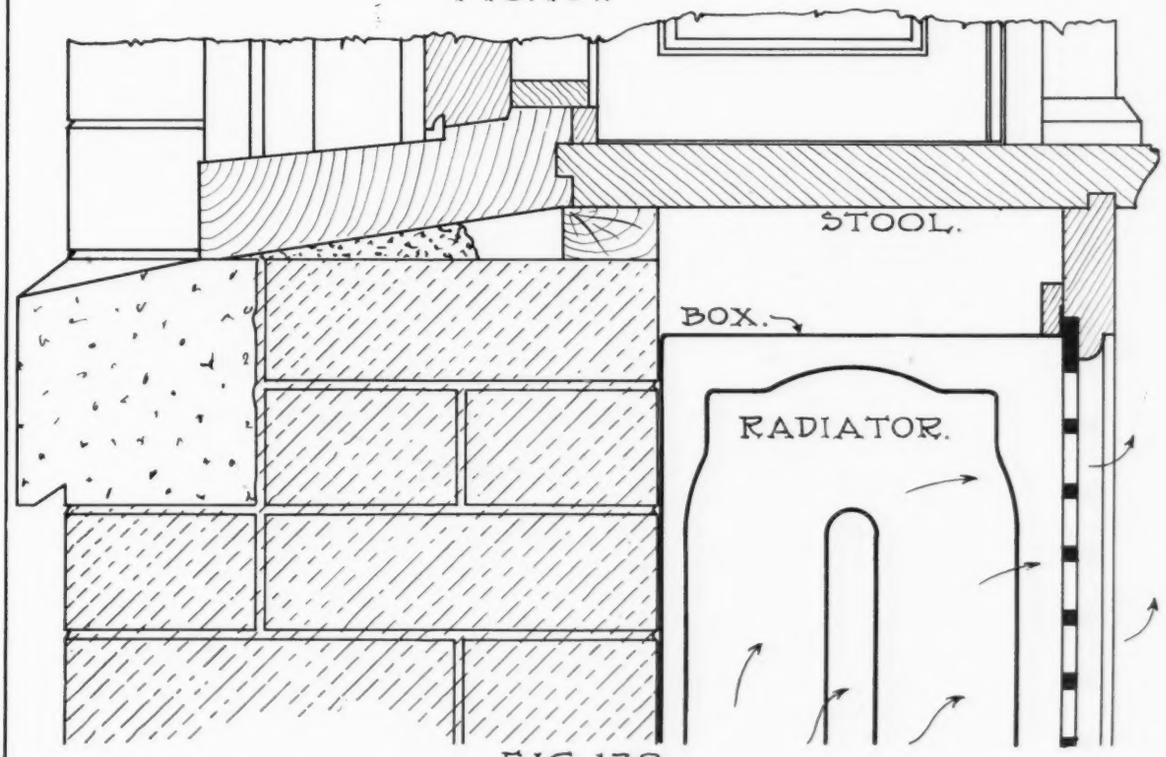
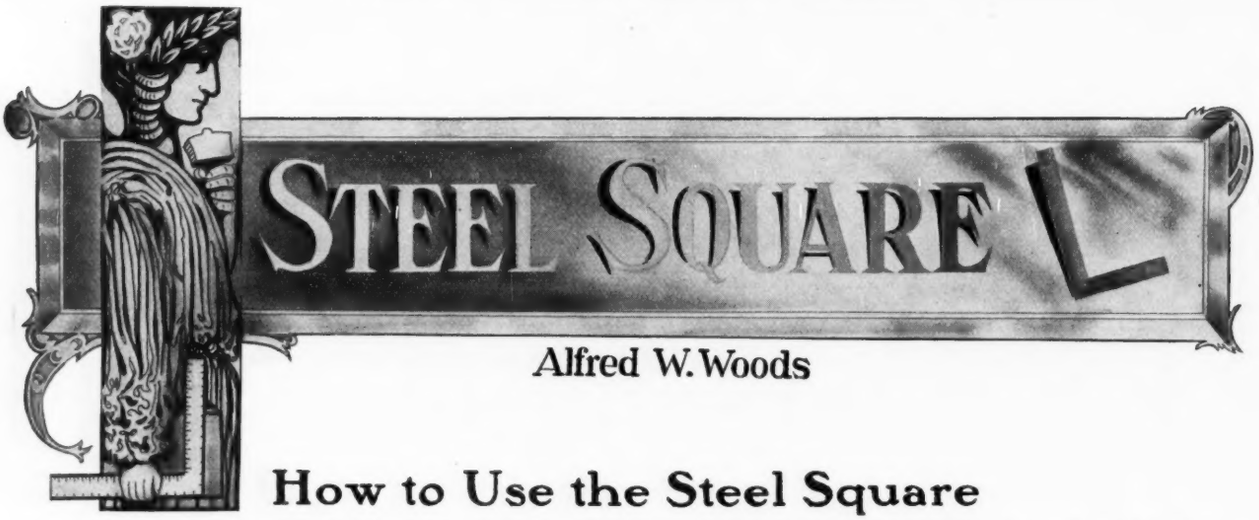


FIG. 138.

PLATE XXXI.

WINDOWS.



Alfred W. Woods

How to Use the Steel Square

SHOWING HOW TO APPLY THE STEEL SQUARE FOR THE BACKING LINES FOR POLYGONAL HIPS, TAIL-END CUT FOR THE DIFFERENT HIPS, SIDE CUTS FOR POLYGONAL JACKS, ETC.

TAKING up the subject where we left off in the last number of this magazine, we show in Fig. 79 the backing line for the octagon hip. From this, it will be seen, that the method is the same as that

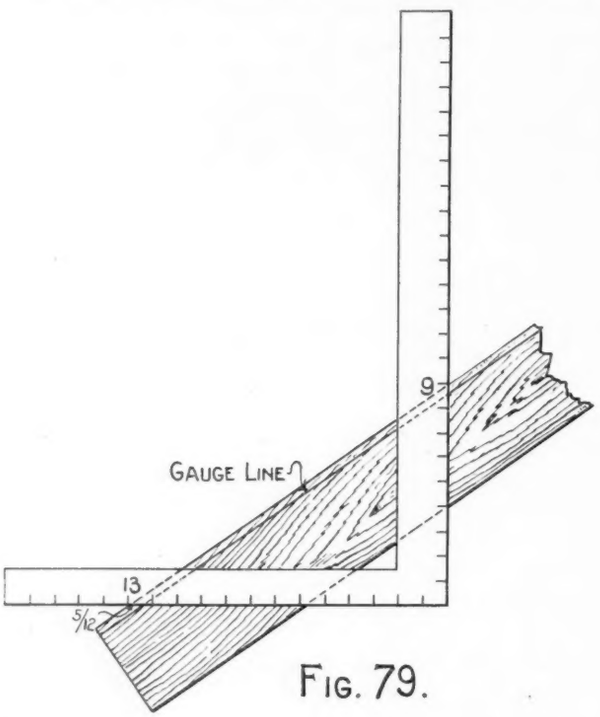


FIG. 79.

for the hip resting on a square corner, which is shown in Fig. 78 of our last article. In this 17 and 9 gives the seat and plumb cuts for the ⅜ pitch while 13 and 9 give the corresponding cuts for the octagon hip. In the former a point 12 twelfths, or one inch, is taken back from the edge of the rafter along the seat cut for the gauge line, while in the latter, the point is taken 5 twelfths back. The backing for any other polygonal hip may be readily found in the same way by setting off the tangent for one-half the thickness of the hip. Thus for the hip resting on a square corner, the tangent is equal to one-half of the thickness. In other words, the amounts to set off are the same figures as those used to obtain the side cut for the corresponding jack (See the figures opposite the blade in Fig. 76), but consider them as so many twelfths of an inch. Thus it is 12 twelfths or one inch for the square-cornered building, 8¾ twelfths for the pentagon, 7 twelfths for the hexagon, 5 twelfths for the octagon. The figures to use for other polygonal roofs are shown in Fig. 76 but the reader must bear in mind that the fractional part of the number becomes only that part of a twelfth of an inch. Thus, for the octagon the number is 4 23-24, which is lacking only 1-24 of a twelfth of an inch of being 5 inches. This is so near being 5 that

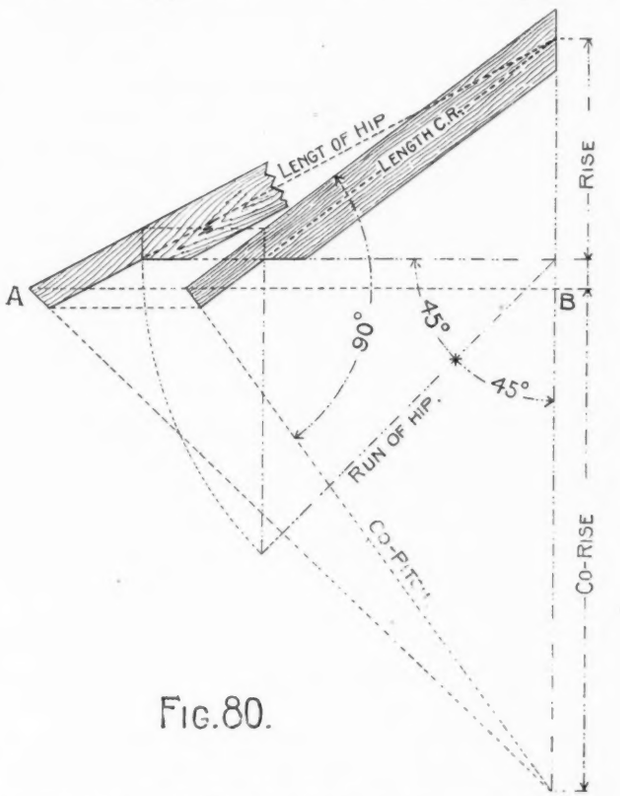


FIG. 80.

we call it 5 twelfths of an inch for the amount to set off on the seat cut line as before described and shown in Fig. 79.

The backing line for a hip for a triangular building would be 21 twelfths or 1¾ inches to set off on the seat cut line, the latter being obtained by using 21 and 9 as compared with Figs. 78 and 79.

There are other ways of obtaining the backing lines of the hip with the aid of the steel square, some of which we will take up later on in connection with uneven pitches.

The backing of the hip is too often neglected. In fact, in most cases is not done at all, or if it is done, it is in a haphazard sort of a way. We have seen laborers (we will not say carpenters) take a hand-ax and hew off the corners of the hip, after it was set in place, at the time of putting on the sheathing boards. The valleys too should be backed and in most cases should be doubled on account of the downward thrust of the roof causing extra weight on the valleys. However, it is not our intention to discuss construction in this work, but where the valleys are so doubled they should be backed one way only and that before spiking together. This makes a substantial valley and solid bearing for roof boards.

Tail End Cut of Hip or Valley

This, too, is one of the neglected cuts, and carpenters generally pay no attention to it further than to leave the tail end long enough to catch the facia and then scribe the end cut to correspond with that of the common rafter.

In Fig. 80 we show this cut as at "A" and how it may be obtained with the steel square. From this, it will be seen that it is rather a difficult thing to get at, since the measurements are, so to speak, in another latitude. In all roofs there is an unseen, or co-pitch, and the end cut of the common rafter represents that pitch, and which, if cut square, will rest at 90 degrees from the given pitch of the common rafter, and the cut in question must necessarily coincide with the unseen or co-pitch.

In Fig. 81 is shown the application of the steel square for the seat and plumb cuts for the ⅜ pitch for the common rafter and the corresponding hip for the octagon and square cornered building. The dotted lines clearly show the angle that the tail end cut must bear to that of the common rafter.

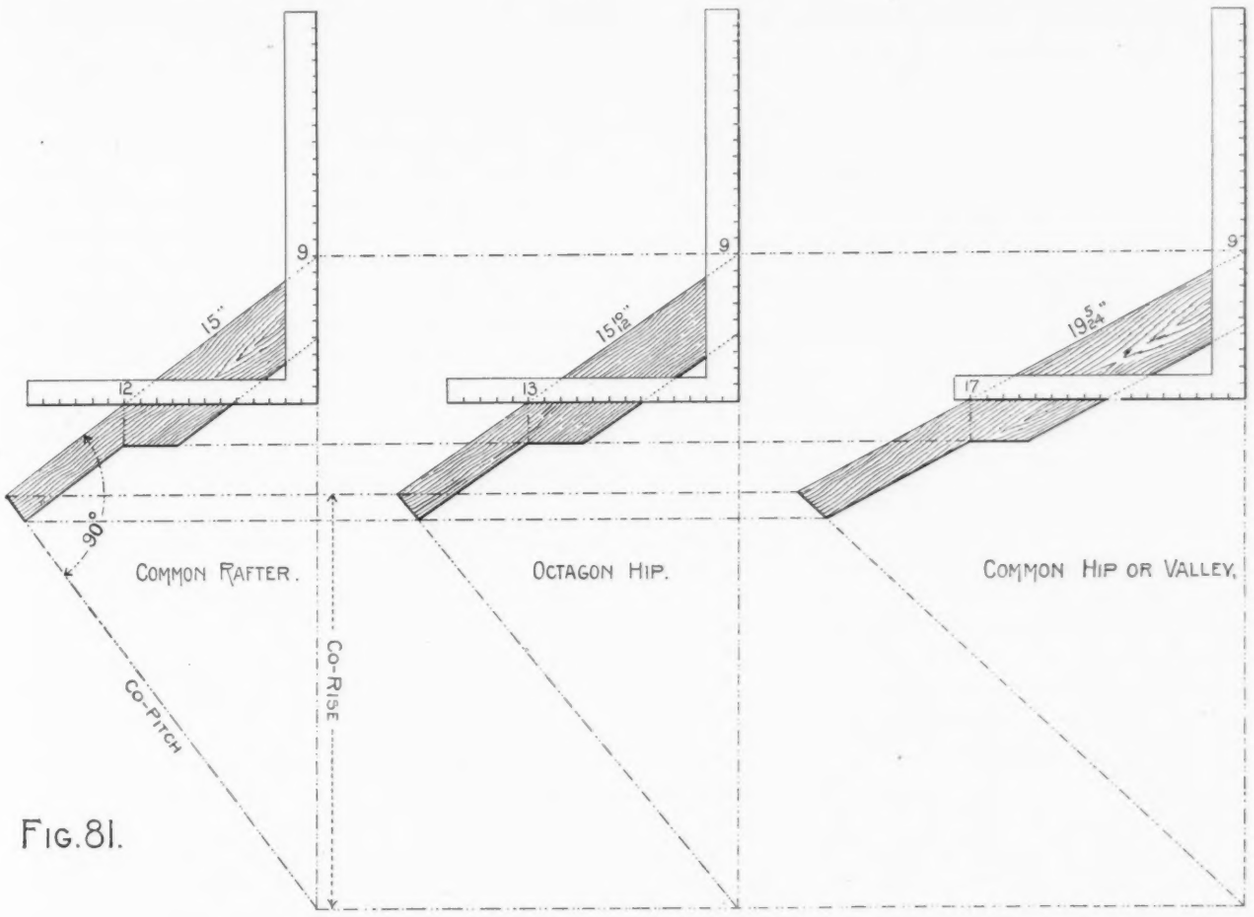


FIG. 81.

There is no general rules so far as we have been able to find whereby this cut can be had direct from the edge of the rafter, as in other cuts, but it may be had by taking the run (17) on the tongue and the co-rise on the blade and applying this to a line parallel with the seat cut and the tongue will give the desired cut as shown in Fig. 82.

However, this is only the angle or where the cut would be at the center of rafter. To get the proper angle on the side of the rafter, the cut would pass through the point on the seat cut as before described for the backing lines.

The foregoing practically covers all of the cuts and bevels about the even pitch roof that may be readily obtained with the aid of the steel square. There are, of course, other ways of arriving at the same result by geometrical diagrams, etc., some of which we will take up later, but there can be nothing better than a thor-

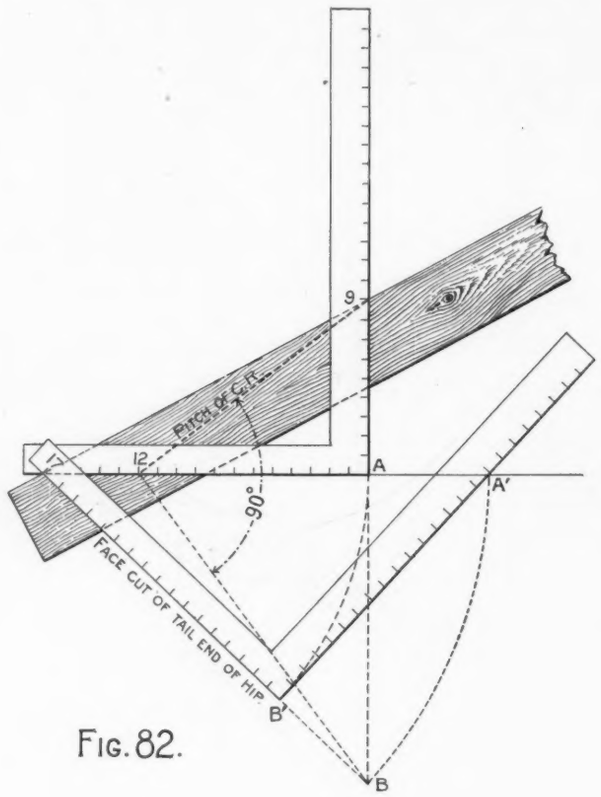


FIG. 82.

ough knowledge of the tangents on the steel square and the relation that they bear to one another.

In Fig. 83 we show the side cut of the jacks from a 4 to 24-inch rise to the foot run and for polygonal corners from 4 to 12. In Fig. 67 is shown the side cut of the jack for a square-cornered building for the ⅜ pitch. The same is shown in Fig. 75 for the octagon corner, but in this illustration we show the figures to use on the steel square for twenty of the pitch lines and for the square corner and eight of the polygonal jacks, also for the level miter making in all 220 side cuts, or miters, that can be had from this illustration alone. Since the tangents of the polygons govern the figures to use on the tongue, they are as shown in connection with this illustration. Thus, to obtain the side cut of the pentagon jack for the ⅜ inch pitch, we use 8¾ on the tongue and 15 on the blade. The blade giving the cut.

Proceed in like manner for the hexagon jack, using 6 11-12 on the tongue, and so on to the end. While we have only given the figures to use on the tongue for 8 of the polygons, they may be readily found for any other polygon as before described in Fig. 27. The reader will notice that several of the pitch lines are beyond the length of the blade and in that case it is necessary to reduce the scale, which may be done by taking one-half of the lengths here given on the blade and tongue. The tangent for the triangle is practically 20¾ inches, which is beyond the length of the tongue, so that it is necessary to make a reduction in the scale, so as to bring it in on the tongue. Then if we take ½ of 20¾, which would be 10⅜, on the tongue and one-half of the length of the pitch lines as given, will give the desired cut. Thus for the ⅜ pitch it would be 10⅜ on the tongue and 7½ on the blade. The blade giving the cut.

We fancy we hear the critic say, "Why go into all these side cuts of jacks for roofs that are not in style and never will be." To such our answer is, If you understand the principle of the side cut of the jack for a common square-cornered building, you will understand for the polygonal jacks whether you are ever called upon to frame them or not.

As we write these lines we are reminded of a contractor who had a hexagonal roof to frame. He had a good working force on the job and the time that was lost in help and waste of material would have made a nice profit. Another time a lot of masons were laid off one-half day to give the "Boss Carpenter" time to go to a neighboring barn where he could have a level

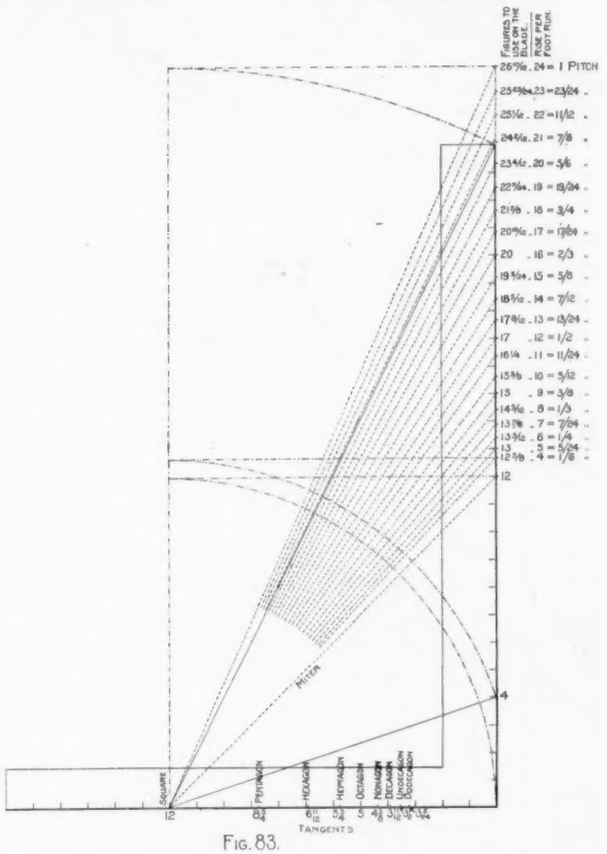


FIG. 83.

floor to lay off a diagram for a full-size octagon template for the masons to work by, and yet these men thought they understood the square. They could frame the common hip and valley roof, but when they come to something a little out of the ordinary they did not understand the true principles involved. If these men had possessed a knowledge of the tangents and

how to apply them on the steel square, they would have known in a minute's time what figures to use for all of the cuts, lengths and bevels required in the work.

We have seen the carpenter after cutting and setting the common rafters, climb up to the gable and scribe the sheathing boards to the pitch of the rafter instead of using the same figures on the square that he used for the seat and plumb cuts of the common rafter, and yet, he too in his mind knew all about the square and how to frame a roof.

If the first man had possessed a knowledge of the tangents, he would have multiplied the inscribed diameter of the hexagon by 6.93 (6 11-12) and reduced to feet and inches, would have given the length of the sides and all of the cuts and bevels for the roof. The second man should have multiplied his diameter by 4.97 and reduced to feet and inches, would have given the length of the sides of his template. The third man should simply apply his square for either horizontal or perpendicular boards as shown in Fig. 67. It is the knowledge of such things as these that counts in the race for success, and the day is fast approaching when he who would be successful in his trade must know the shortest and best methods.

Red Gum for Finish and Cabinet Work

TENDENCY TO USE RED GUM MORE UNIVERSALLY FOR INTERIOR FINISH—HOW TO OVERCOME SOME OF ITS DEFECTS, ESPECIALLY ITS WARPING TENDENCY

By J. Crow Taylor

THERE is probably not a wood in the United States that has had more said about it the past few years than red gum, and yet when it comes right down to the truth of the matter the average man does not really know much about it. The gum enthusiasts have claimed every quality immaginable for it that is calculated to help sell it, while on the other hand, some of those who have tried to use it would not touch it again with a forty-foot pole. The gum enthusiasts have evidently made some mistakes in their enthusiasm. One is in claiming too much for it, and the other is in not really recognizing the value of the natural tone and color of the wood under proper treatment.

Over at the St. Louis fair there was gum galore. In the forestry building one end of the building looked like more of a red gum show than anything else, while over at the House of Hoo-Hoo one room including floor, finish and even the furniture therein was made exclusively of red gum. Still, neither one of these displays actually did justice to the wood. In the forestry building the bulk of the wood was in an unfinished state, simply being planed, while at the House of Hoo-Hoo, where better finishing was done, they stained the wood to make it look something like red mahogany. What could possess any man to induce him to stain red gum after seeing it properly finished in its natural color is more than I can see. When properly finished the natural wood shows a beautiful soft brown color that should make it an ideal finish for libraries and give elegance to cabinet work and furniture. Lots of the wood has the monotony of solid color relieved and its beauty intensified by beautiful figures that adds to the effect materially, and makes it look like it is almost as much of a sin to stain a piece of nice red gum as it is to paint a piece of quartered oak.

It is a peculiar fact that notwithstanding this really beautiful and artistic coloring which the wood has, our furniture manufacturers who use it extensively, generally take it simply because it is cheap and use it for back panels and things of that kind on high grade furniture, and where it enters the face it is made into a class of furniture that is cheap from start to finish. Kitchen cabinets and kitchen tables and things of that kind are examples of its use, where the sappy and the red are used indiscriminately and it is evidently used not because it is appreciated, but because it is cheap. If this wood was not cheap, if it were imported from Africa or somewhere else we would be raving over it, and even as it is its natural beauty is beginning to attract the notice of leading architects, and it is now entering house finish and is giving such a high degree of satisfaction that we may look for its use to develop considerably the next few years. The wood is a close-grained wood, is comparatively easy to work, finishes smoothly and takes polish like mahogany. It also takes stain nicely, better, the architects claim, than birch, which comes in handy if one is using white or sappy gum, but it's a shame to stain nice red gum, and I hope the architects will soon begin to realize this point.

The main handicap to gum aside from its cheapness is its warping tendencies. And it is because of this handicap that many of those who have experimented with it once are not anxious to touch it again. There is probably not another wood among our forests that has as strong a disposition to warp and more strenuously resist efforts to straighten it up after it has warped than gum, and added to this is a tendency to stain and rot in the pile while drying. Still, they have for years been buying it over in Europe under the name of satin walnut, and they seem to get along with it very well. One prominent shipper of the wood says that the climatic conditions over there are better for it than they are here; another says that they season it longer and take more pains with it, but no matter how they do it they get much better satisfaction out of its use than we have been getting here. Moreover, we can get better results with it here if we will take a little more pains about seasoning it. Gum should be carefully piled, with plenty of small, dry

cross strips in it, and up off the ground enough for it to get plenty of air through the pile. There are also in vogue several special methods of treating gum by mill men, which it is claimed will cure its warping tendencies, one of which is to dry it and then steam it and dry again. Probably a little water seasoning would produce the same result.

There is one sure way to get around the warping tendency of gum, and that is, to use it in the form of veneer, and its use in this manner is growing rapidly. When used in the form of veneer, either as a face for other wood, or in built-up wood of its own kind made into panels its warping days are ended, and it can be handled with the same assurance of staying where it is put as the best woods we have. This is probably the best, and it will likely be in the future the most extensive manner of using gum, but any carpenter who has a mind for experimenting, and an eye to the artistic can improve his views of gum as a lumber by making some of it up into a piece of furniture or cabinet work and finishing it properly. Usually any carpenter who is anything of a genius or is worth while as an experimenter can devise ways and means to safeguard his lumber against warping after it is made up. In other words, he can design and frame up his work so that it will hold straight. Of course, he can't use it just like he would use mahogany, where a board of any width can be used without any protection of any kind against the elements or against warping, for mahogany is one of the few woods that dries easily and stays straight. That's one of its valuable qualities that gum does not possess, but aside from that, gum makes a very good showing along side plain mahogany when it comes to finishing. Take some of it and try it once for yourself; don't stain it, don't paint it whatever you do, but rub it off and finish it carefully for its natural color, and the chances are nine times to one that you will be surprised and highly pleased with the result and will feel inclined to root for gum as a finishing wood, to say nothing of cabinet and furniture work.

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Modern Systems of Piling

Pile foundations may be divided into three general classes—those in which the building has to be supported upon treacherous land with a sound foundation below, those in which the soil is uniformly weak, but capable of bearing a load if it be spread over a sufficient surface, and those where there is no strong bottom obtainable, but sufficient resistance in the upper layers to hold up pile supports by means of friction. The general way of dealing with the first and third of these systems is by means of wooden piles driven by the usual monkey or ram, while the piles used for the second class are those known as screw-piles, made of cast iron or steel, with very large flanges. These are of comparatively recent introduction, and are employed largely for marine work, where definite loads are located upon small points, and the foundation has to be spread by screwing the pile in for some distance beneath the surface, when the broad flange gives a sufficient area to carry the weight. Below the flange the end is either serrated and left hollow for penetrating such a substance as sand, the interior of the pile filling up; or else a solid point is formed with a gimlet-like continuation of the wide flange screw to assist in boring into a more resistant surface, upon which this point can also obtain a definite hold and so assist in carrying the weight.

The old timber pile has its limit of usefulness and its limit of duration. It cannot be employed when subject to alternate wet and dry, as the timber under such circumstances is almost sure to rot, though if entirely embedded in moist earth it has been known to last for many hundreds of years. It is also impracticable when the solid is not reached within the limits of the length of an ordinary piece of timber, nor when the weight to be sustained is excessive, as it often is in heavy modern engineering works.: During recent years these difficulties have been overcome by the employment of long piles constructed of concrete in which steel rods are embedded, these being cast in advance, allowed to set, and afterwards driven in the ordinary way. They can be made of very considerable length, greatly in excess of that which can be obtained in timber, and they are usually of larger sizes, say from eighteen inches to two feet square. In some places, particularly in modern harbor work, they have been extensively used of late; but many engineers still consider them to be upon their trial. At first difficulties were experienced in driving them satisfactorily, as the heavy ram tended to break up the concrete of which they were composed, until a method was devised by which the impact from the ram was taken up almost entirely upon the steel rods. There is still, however, a very generally felt doubt whether these rods may not rust up, however carefully the concrete may have been made, and in course of time expand and break to pieces the whole structure. Certainly, so far as they have been used, made with care and driven with care, they seem to be satisfactory, and there are very many circumstances under which their employment is probably better than that of any other form of pile, particularly when a solid substratum underlies a considerable depth of exceedingly soft, moist earth or water. The length to which they can be made and their strength are very great factors in their favor; but when used for dock jetties the precaution must always be taken of protecting their faces against the impact of vessels, as a blow sideways upon them might cause grievous injury by breaking away the concrete casing to the steelwork. As a rule, they are shod with iron, while the ram used is considerably heavier than that employed for timber piles.—The Building News.

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A man undaunted by the slurs of envy to-day will accept gracefully the cheers of success to-morrow.

Hollow Concrete Block Construction

NEED OF GREATER EDUCATION IN THE MANUFACTURE AND USE OF HOLLOW CONCRETE BUILDING BLOCKS—HOW AND BY WHOM THIS CAN BE DONE

By Harmon S. Palmer

THE intelligent public has learned during the last two or three years, that in hollow block machines "all is not gold that glitters," and many who have embarked in this business with the idea that all they had to do was to buy a $100 mould, some cement and sand, and set the boys at work making hollow blocks when the architect and builders would be running after them for their product at exhorbitant prices, have found themselves woefully mistaken; the same may be said of the machine men themselves. Many have supposed that anything which would produce a block of artificial stone with a hole through it fulfilled all the requirements of a superior building material; that this theory has been completely exploded no one can deny, yet all will admit that acceptable material is produced from concrete in the shape of hollow blocks and that handsome and desirable buildings are constructed with them. There is not an intelligent architect in the country who will deny that hollow block buildings have many superior qualities including price, over brick and stone, providing the following points are satisfactorily covered:

First, as to price, in which there is no question.

Second, it must not absorb more water than good, burned brick.

Third, that monotonous appearance so common to these new houses, must be overcome.

Fourth, the blocks must be so diversified in size and design as to fit the most intricate plans, which the ambitious architects are vying with each other to produce; this being the case, let us analyze the situation.

In regard to price, is it not plain to every thinking person that the increasing scarcity of timber not only suggests a substitute, but actually compels us to look for one; this substitute is not only found in artificial stone, but is fully recognized as far superior by every intelligent builder in the country, provided the above objections are overcome.

The intelligent people have learned that in regard to absorption of water, some cement stone will absorb much while others are hard and dense, proving that spongy concrete is not properly made and that the difference between the good and bad is wholly in its manufacture; in other words, it is a condition which can be absolutely controlled at a trifling cost, by the educated workman. It matters little how much the outside shell of the hollow block absorbs, provided it does not penetrate to the inside wall. That this is not necessary can be proven by hundreds and thousands of occupants of these houses, who will testify to their absolute dryness, and the clear and sanitary atmosphere produced by the nature of the cement and profusely ventilated walls; therefore it will not do to bring up, as an illustration, some soft, poor stone, by which some houses have been ruined, to prove that hollow blocks are not fit for building, because a large majority of these buildings plastered directly on the blocks, subjects such statements to ridicule. It is no less ridiculous to assert that the one piece block properly made is more liable to admit moisture to the inside than the two piece block; neither one will admit moisture to the inside unless their manufacture and work of laying was of the poorest kind (but the one piece is very much cheaper to lay and sub-divide), therefore it is proof conclusive that when moisture penetrates to the inside, the fault is in something beside the system and method of construction, and we might add with absolutely no fear of successful contradiction, that facing blocks with a richer mixture is entirely unnecessary and an added expense. When waterproofing is put on the outside of a building, it is to remedy a defect which should not and need not exist, and when it is added to the material in the form of powder, which is preferable to liquid, it is as a precaution, and while not always necessary, is often desirable in consequence of incompetent handling; therefore, education should be advocated in the strongest terms, relating to dense stone, to mechanical construction of the blocks and properly laying them in the wall.

The third and next objection so often heard is that the houses have such a sameness of design; that there are not enough side plates to go with the machinery. There seems to be a lack of architectural effects, etc., but does it not appeal to the average person when told that the industry is but a few years old, while brick is as many thousands of years old, that concrete blocks, the material of which is more pliable in the hands of the artisan than any other building material known, will fast gain the attention of architectural masters, the same as it has gained the attention of the sculptors in bas-relief and statuary. Who could after seeing fail to remember to the end of life some of the statuary and monuments of art wrought in Portland cement concrete by German and French masters and exhibited at the World's Fair at Chicago, exciting the admiration and ambition of thousands of embryo builders, as did the works in marble of Michael Angelo enthuse the ancient sculptors? There is no limit to the possibilities of ornamentation of every description with this material, and one is almost appalled at the imaginative pictures and untold beauty of dwellings which future generations will possess, as may be built of this material. Education in this line is all that is needed—it cannot be suppressed—it is

food and drink for many ambitious young builders and means the elimination of sameness and monotony, which is rapidly being accomplished by the block machine manufacturers.

The last problem to be met is to diversify the size, shape and design of the blocks to meet the growing ideas of the architects. He says: We must have blocks to carry out our designs as made in our offices. In regard to this situation there exists quite a misunderstanding with some of the architects, as well as many other persons; it will be understood that in the inception of the industry, many difficulties were encountered and the one feature which seemed to appeal to the prospective builder was the cheapness of construction. Using this argument to the best advantage and planning the houses with a view to geometrical construction without cutting stone, the pioneers were enabled to erect some acceptable houses, sacrificing everything to cheapness until attention could be brought to the merits of the blocks as they seemed to the promotors; all but the simplest possible construction was dispensed with, but with the later and rapid acceptance of the system other details were soon called for, and among them machines which must be so constructed as to admit of a higher branch of the art. While this higher branch was just as clearly conceived by the promotors as the simpler one, yet it was impossible to begin the introduction of hollow blocks in this way. It was necessary to begin at the very bottom and the first contract was a retaining wall of less than 100 blocks.

At present there are two classes of people for whom these blocks are particularly adapted; one is the same as the first mentioned, because they were cheap and at least made an acceptable house, with many qualities superior to a cheap, wooden house. To-day the demand has grown for the same material, but in a more artistic style. Many supposed this was not possible with hollow blocks because they had never seen it, and because numerous interested parties have claimed for it this, and other defects, which do not necessarily exist; therefore, greater education is necessary in this respect. It might be said here that the machine of to-day is made to meet all the requirements of the architect; should he desire a stone to fit any angle, the up-to-date machine can make it; if he desires a frame stone, with an ornamental reveal, the same machine will make that, of his own design, in rights and lefts, corners and circles; blocks with bas-relief and medallions taken from the living face can be produced with these machines; running and pannel mouldings of the most exquisite patterns are easily and cheaply made; duplicates of the masterpieces of artist's models are often produced and seen in buildings surrounded with rich borders of mouldings in egg and dart, O. G.'s, dentals and any of the elaborate designs within the province of the architect. Blocks of all shapes and contour, both outside and inside, with one, two or any number of air spaces in any position, are easily made by the simple adjustment of any up-to-date machine. It is education that is needed to understand the difference between various machines and contrivances so freely advertised, and then education is needed to understand the co-operation of the machines with the architect's plans. Architects need more education as to the flexibility of the modern machine and should work in conjunction and harmony with the machine manufacturer, bearing in mind that general success in the industry as it is to-day depends on keeping within proper line with each other, but education and development will go hand in hand, until the people of the future will see none but houses moulded from plastic stone, artistic and beautiful, fireproof and durable, sanitary and prolongers of life.

It would have been much better for the industry if its introduction could have been controlled and allowed to proceed no faster than experienced men could be found to teach the proper method, but, like every other good proposition, it is at once grasped and exploited faster than the public can comprehend the details; the results in this case being to flood the country with every conceivable device from machines large enough to turn out a battleship to the little box moulds of sixteen inches square. They can be found in every village and cross-road in the hands of those, many of whom have invested less than $100, sometimes all they had, and it will require years to undo the harm which many of them have done in trying to introduce experimental stone, made on experimental machines and sold to experimental builders, many of whom will never "get out whole," as wished for in the expression of one of them.

The fault is not in the system, but in a lack of education, and the more strongly this is realized the better it will be and every successful block factory and editor should help in proper education.

Effects of Fire on Concrete

The heat-resisting properties of concrete are a prominent subject of discussion among engineers and fire department officials. A recent fire at Duluth, which destroyed a part of the large Peavy elevator plant, has afforded a test on a large scale, and local reports show that the material came off with all the honors of the contest. Thirty-five circular bins, 110 feet high, with a capacity of 4,000,000 bushels, directly faced the "crib" or working elevator, the latter being completely destroyed by flames, whose heat broke glass in buildings half a mile across the bay. The bins were of steel framework, covered with concrete; they are entirely unharmed and the walls are not even blackened, the fierce heat having burned off the smoke.

Over-estimated personalities are responsible for the downfall of many under-estimated propositions.

Geometrical Handrailing

HOW TO ARRANGE THE RISERS IN AND AROUND THE WELL-HOLE IN A HALF SPACE AND QUARTER SPACE LANDING STAIRWAY SO AS TO SECURE A GRACEFUL CURVE FOR THE RAIL

By Morris Williams

IN THE three first figures accompanying this article is shown a method to get out a rail for what is known in the trade as level landing stairways and in Figs. 4 and 5 a stairway having a riser in the center of a well-hole without the necessity of finding and applying bevels to twist the wreaths which reduces the difficulty of manipulation attending wreath construction for this class of stairways to a minimum.

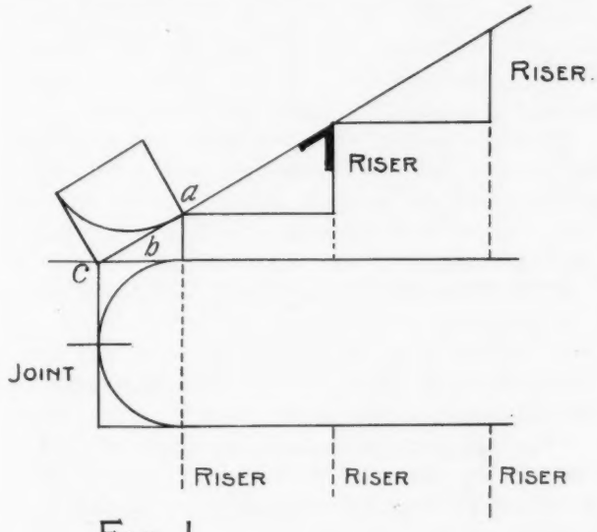


FIG. 1.

In Fig. 1 is shown the simplest method where the radius of the well-hole is made equal to one-half the width of the tread.

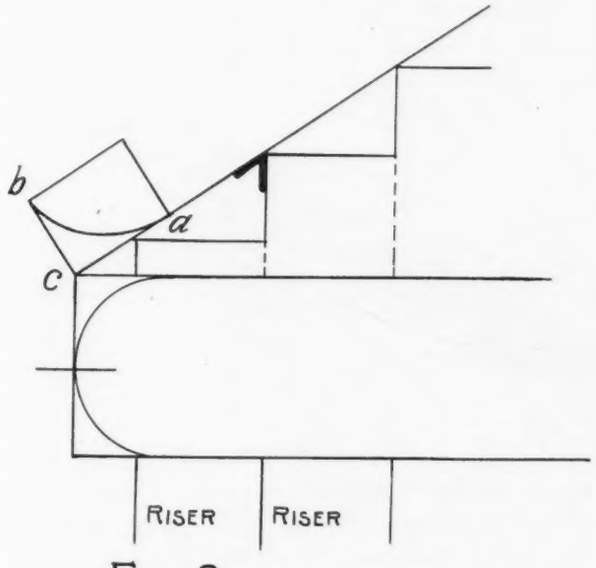


FIG. 2.

The elevation of the plan tangent *b* is shown to incline from *a* to *c* and the plan crown tangent *c* to be level.

A line drawn from *c* perpendicular to the incline tangent *c a* and made equal to the length of the crown tangent *c* will determine the angle between the tangents of the face mold as required to square the joints at each end of the wreath.

The curve shown from *a* to *b* represents the developed central line of the plan rail.

The bevel shown at the upper angle of the pitch-board is to be applied to the end *b* of the wreath. We can scarcely imagine of anything more simple than this method to form the face mold and find the bevel.

In practice instead of drawing the elevation of the steps as shown we merely place the pitch-board at *c* and run a line along its long edge to obtain the pitch of the tangent *c a;* then form the square as shown by drawing perpendicular lines to the pitch line. The pitch-board gives the bevels also as shown.

In Fig. 2 is shown a level landing stairway where

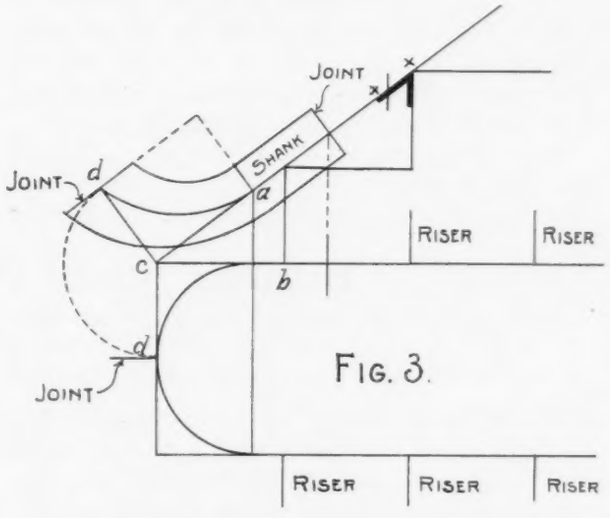


FIG. 3.

the radius of the well-hole is longer than one-half the tread. In this case we fix the first riser at a distance from *b* equal one-half a tread as shown. Thus obtaining the same elevation of tangents as well as similar angle between the tangents of the face mold as in Fig. 1, which is shown at *a c b* to form a right angle; indicating the non-necessity of springing the plank.

The bevel shown at the upper end of the pitch-board applied to the end *b* of the wreath in this case also is all that is required.

In Fig. 3 a riser is placed in the center of the well-hole at *d*, and yet by fixing the first riser of the flights adjoining at a distance from *c* equal a full tread as shown from *c* to *b* we obtain the same results as in the other figures.

The crown tangent *c d* is revolved as shown and fixed at right angles to the inclined tangent *c a* and the joints made square to the tangents as thus determined.

In Fig. 4 is shown a more complete view of Fig. 3 in that it represents a partial elevation of both the bottom and top flights adjoining the well-hole; as well as the development of the tangents and central line of the two sections of the wreath.

Fig. 5 represents the method in practice to form the face mold for either of these wreaths, but in this instance we take our dimensions from Fig. 3, which, as explained, represents a stairway having a riser in the center of the well-hole.

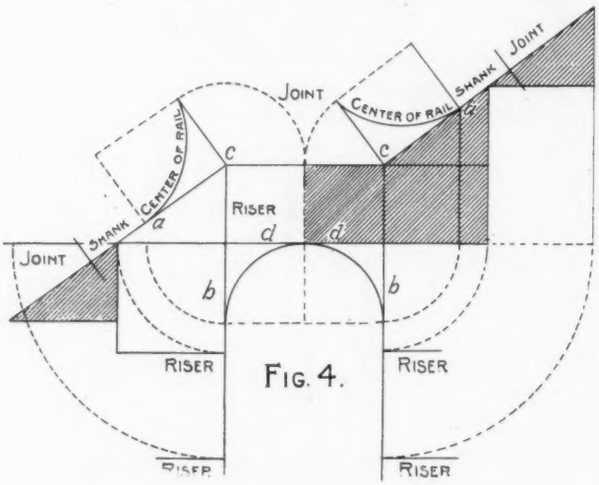


FIG. 4.

The line *c a* in Fig. 5 is made equal to *c a* in Fig. 3, and as shown it represents the inclined tangent.

The line *c d* in Fig. 5 is drawn at right angles to *c a* and made equal to *c d* in Fig. 3.

On each side of *d* in Fig. 5 is placed the distance *x x*, taken from *x x* shown at the bevel in Fig. 3. This determines the width of the mold at this end.

At the end *a* the width will be the same as that of the straight rail because no bevel is to be applied to this end.

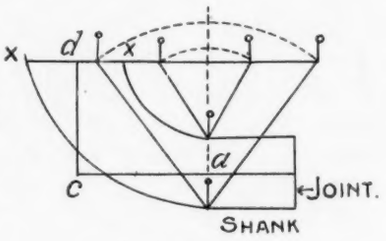


FIG. 5.

The curves of the mold are shown to be described by the method known as the pin and string method, which is the most common practiced by stairbuilders.

It will be observed that a knowledge of how to place the risers in and around well-holes is of great importance, in that placing them indiscriminately will lead to a great deal of extra labor without attaining the least advantage, and often will cause the finished rail to assume such an irregular curve as to make it appear very unsightly.

By following the instructions given in this article in respect to the placing of the risers the construction of the wreath becomes a very small matter—merely to draw two straight lines at right angles to one another and equal in length to the tangents, as shown at *a c* and *c b*, Fig. 3, for the angles required between the tangents on the face mold to square the joints, and as for the bevel it is as shown in all the figures found in the upper angle of the pitch-board.

Framing and Raising Studding

EXPLAINING THE FRAMING AS COMMONLY MET WITH IN DAILY WORK — METHOD OF RAISING STUDDING WHEN WORKING ALONE

By Dwight L. Stoddard

I HAVE taken for my article this month a very large subject. Volumes could be written on roof framing alone and yet not completely cover the subject, and as my friend Woods is covering it so nicely in his articles on the square I will not mention that part of framing in this article. I will simply mention a few simple matters of the most common framing that we come in contact with in our daily work. My experience has been that the best way to frame ordinary studding or joist is to make a good pattern of one, and for two men, one at each end to lay the pattern on and mark off the rest. Of course in very heavy work it is well to make a pattern out of lighter material. It happens many times that one man is left to frame alone, and it is very inconvenient, especially in long work, to go back and forth to mark both ends. In that case I have found it very handy to use a pattern on each side and square over and lay off a dozen or so at a time, as illustrated in Fig. 1. Here I show a long studding notched for ribbon to put second floor joist on. This used to be considered

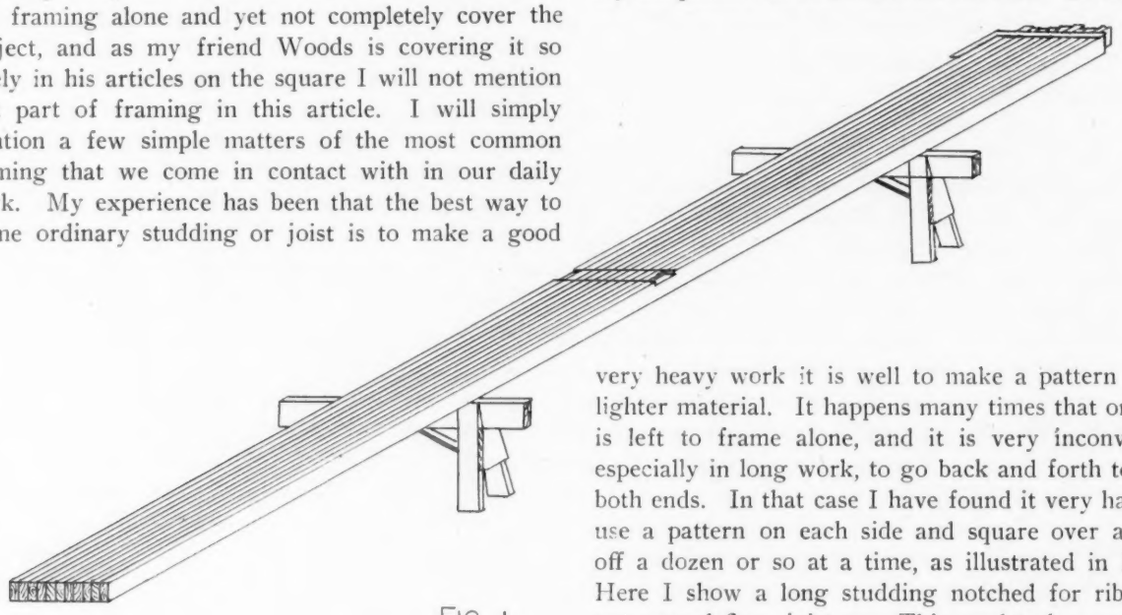


FIG. 1

much better than short studding for each story, but for my part I am glad that in my observation at least the majority much prefer the short studding for each story, as it is surely much easier to handle, and I believe if properly made is fully as strong.

Of course it could be made weak by only slightly nailing the upper studding and have a crack in the

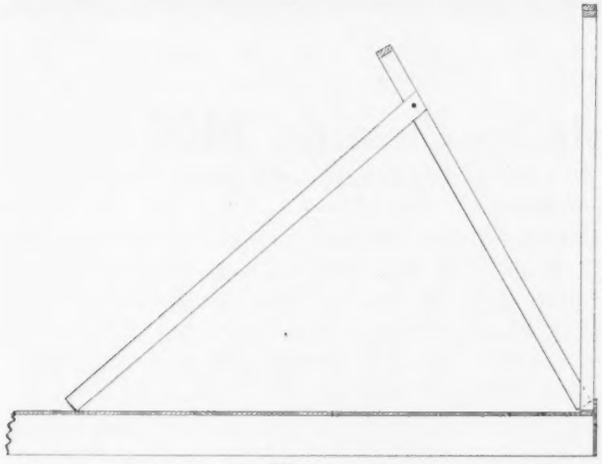


Fig. 2.

lining just at the bottom of upper studding, etc., but these matters can be easily avoided and should be. The long studding can be made weak, and often are by carelessly sawing them almost in two when sawing for ribbon. Again we often see a very weak building of this kind because many of the joists simply rest on the ribbon and are not spiked to the studding at all. Most of these weak points in either style could and should be avoided. The British Government has shear legs in their dockyard at Chatham that will raise a dead weight of 180 tons out of a ship and into the air 60 feet and place it in another ship, and it makes one realize that raising is a big subject, too.

But it is not the difficult things to raise that I intended to call attention to as much as the simple and common ones. With all the modern derricks and shear legs and old-fashioned spike poles, which are all very useful in raising, the main thing necessary in ordinary house construction is plenty of men. A few to hold down the foot and plenty to raise the studding and the complete wall of a house goes up very quickly and easily.

While it is very necessary to have plenty of men it sometimes happens that we do not have them and I raised a building over 100 feet long not long ago quite easily alone. I did it by nailing together a section at a time, and having a lining board nailed at the bottom to hold the foot down and a studding at each end with a spike in each to help hold it as I raised it as illustrated in Fig. 2. Where there is plenty of help I would always finish the openings complete before raising, as it is much easier while the studdings are lying down than it is to climb up and cripple them in.

Fig. 3 illustrates a section complete. A common window opening may be made with single studding and headers flat ways, but for larger openings they should be doubled and the header put up on edge and where necessary a brace should be cut in to form a kind of truss. For a very large opening that kind of crippling generally makes a very poor job and a much better way is to use a joist of sufficient width and strength. Many times we see a house with single dressed plate

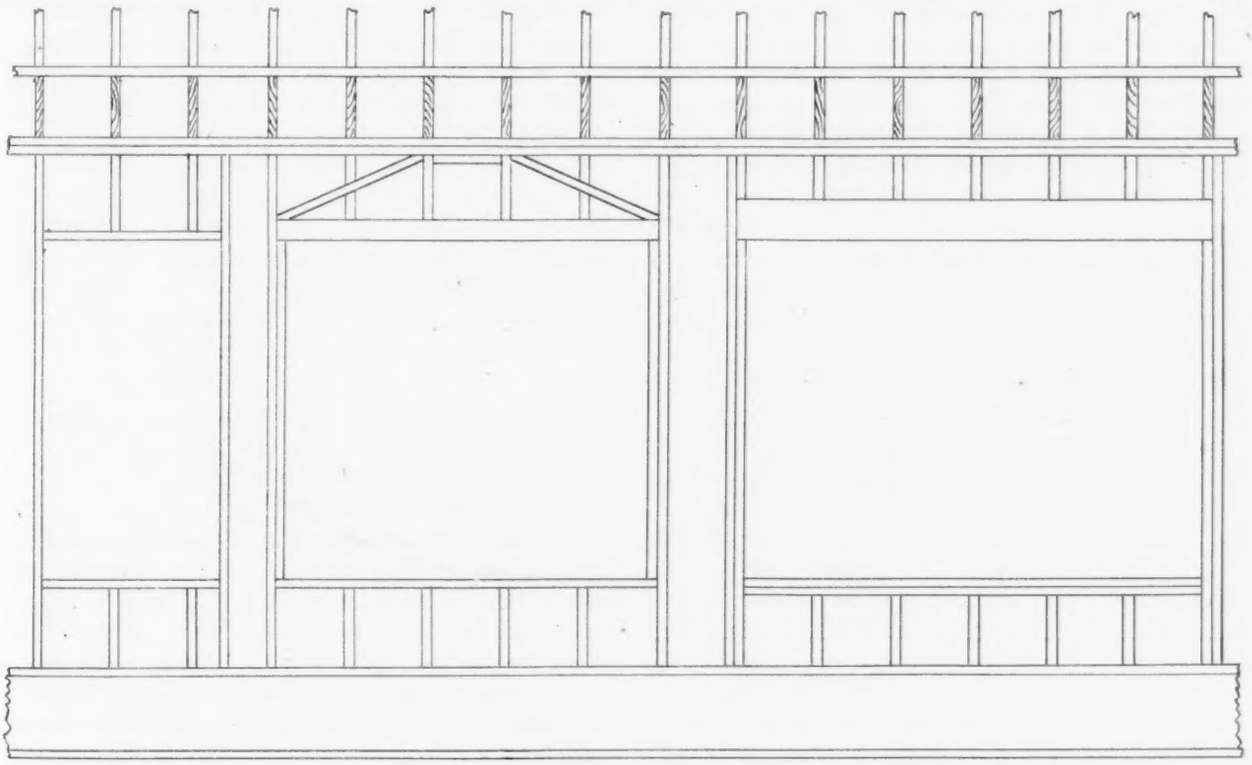


Fig. 3.

(*Continued on page* 567.)

Labor Saving Methods in Planing Mills

MORE GENERAL USE OF TRUCKS A GREAT LABOR SAVER—WAYS IN WHICH THEY WILL REDUCE COST AND IMPROVE CONDITIONS

IT'S a little queer, but a fact just the same, that almost any of us can go into some other fellow's shop and find things that we not only think are not just right, but we are frequently and generally quite free to express the opinion that if we were doing it it would be done differently. And maybe we don't stop to think about it, but the same fellow that we feel like criticizing, should he come to our place, would see something to find fault with, too. It's because we see things in a different light, have different ideas generally. It's a good thing it's that way, too, otherwise we would have a mighty monotonous time in this world, and it's a good thing for us to give our views, even to the point of finding fault with what the other fellow is doing, or the way he is doing it, provided, of course, we do it in the right spirit. We don't want to fuss, nor pick holes in each other just for the sake of exposing weak points, but it does do us good to swap ideas with a view to increasing our fund of knowledge. That's the spirit I want to say some things in about what I have been seeing in my rounds.

Just the other day I was in a planing mill, located in a thriving country town and doing a nice little business, and saw one of the partners of the concern running some fence posts through a smoothing planer. The first impression this made on my mind was that these were prosperous times with the community, and people were not only building more pretentious homes, but were getting more particular about the looks of their fence posts than they used to be, which was all right, and a good sign generally, but the manner in which the work was being done soon set my thinker to going on another tack. The posts were being surfaced on three sides, so as there was only one head running in the machine it meant running them through at least that many times. I looked more closely at the machine, and saw that it had four heads, and wondered for a minute why the man didn't set up all the heads so as to do the job at one operation. The explanation for this was easy, though; it was only a small job and could be run four times in the time it would take to set up four heads, and besides the side heads were probably never intended for doing work as heavy as those posts. But the thing that struck me then, and sticks to me yet was that the man was doing too much hard physical labor, was literally working himself down on a hot day when he might have taken it easier and made better time. He had a helper behind the machine who was taking these posts as they came out and piling them down on the ground at one side, and the partner had to carry them from there around to the front of the machine as he fed them through the second, third and fourth time.

"Well," you may say, "what else could the man do—make the helper carry them around?" Do? He could have had a truck there to pile those posts on as they came from the machine, so that when they were through once he could push the truck around to the front of the machine where he could feed them through without having to work himself down. And now that I have said this much I feel like going further and preaching a little sermon on labor saving machinery and appliances. No, not the way you are probably thinking about, not a discussion of the relative merits and cost of hand and machine work, nor whether or not machinery makes more or less work for the laborer. What I want to talk about is labor saving in a literal and personal sense. To point out that there is no sense in a man working himself down in a little while, when by the use of proper appliances he can free his work from its burdensome feature.

While I watched this man wrestle with those posts there came to my mind a picture of a modern woodworking factory in which I had once spent a year, a place that needs telling about because of the contrast it furnishes when compared to the average planing mill, and because we may get a pointer from it that may be worth while to a few, at least. It doesn't matter just what we made in the factory, as the feature is in the way we handled the stock. There were about thirty machines, and practically everything worked went to three or four, and some times a dozen machines before it was ready to go to the carpenter shop up stairs to be assembled and put together. There was plenty of light, and everything was carefully arranged, the floor clean and smooth, and on that floor was an abundance of trucks, trucks that could be moved easily with the heaviest kind of a load, for they

were well oiled, and the floor was exceedingly smooth. Well, while I thought there was an abundance of trucks, more than I had ever seen in one factory before, while I was there we made fifty more, and after we used them all awhile I wondered how we ever got along without the additional fifty.

Now, then, just compare this picture with that of the average planing mill, and see what a contrast you get. In the mill referred to there was not a truck of any kind in sight. Maybe it was due to using the ground for a floor and the fact that trucks won't roll as nicely on the ground as they will on a smooth floor, and if that was it, it is a mighty strong argument in favor of putting a floor in the shop. But there seems to be lots of planing mills, even with floors that have no trucks at all, and I have the first planing mill to see yet that had anything like enough trucks in its equipment. How many times do you suppose work is thrown down to be picked up again and moved in the average planing mill? Don't jump at a conclusion on this point, but watch your own work and see, and then remember that in that factory where we had so many trucks, though work might go to a dozen different machines before it was ready for the carpenters, it very seldom got on the floor from the time it came in rough from the yard to the stock sawyer's bench till it landed in the carpenter shop, and even there it was generally worked direct from the trucks instead of being unloaded. In other words, we cut out all that was possible of the burdensome part of the work, and as a result it was not only a pleasant place to work, but the men seldom became very tired, they were not overburdened, consequently they were cheerful, could and did give better attention to the more important features of the work. And last, but not least, that place could turn out its product at a lower cost than any place I have ever seen, at a cost for wood-working that would make the average planing mill man throw up his hands and declare it couldn't be done, and done right—but it was.

It is possible, probably to give too much thought and attention to the subject of handling work so as to spare its burdensome features, but this subject certainly needs more attention than it gets at the hands of the average planing mill man, and it needs it from two standpoints—to relieve the burden, and to reduce the cost. Leaving the burden part out for a moment, it should be easy for any man to figure out that it takes time and costs more to pile a lot of work on the floor and then have to pick it up again and carry it to some other point in the shop for the next step in the work. Just watch yourself once, count up the waste time and energy that is expended in such efforts and see if you can't reason it out on a logical basis that some good trucks would be a paying investment. Then it pays, again, indirectly, maybe, but immediately, just the same, in the very act of relieving the burden. It keeps a man from working himself down and getting his nerves all unstrung at unnecessary physical exertion, so that he not only does more of the real skilled work, but does it better—and feels better while he's doing it. There are some other things, too, besides trucks that might be looked into in this quest of lightening the burden, but one thing at a time is enough, and one thing that it will pay many a planing mill man to do is to look well into the subject of, and invest a little in some good trucks.

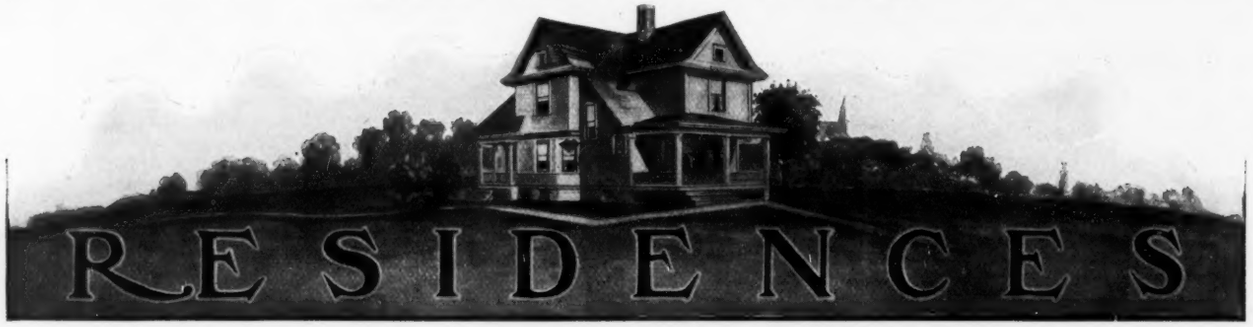
The Twentieth Century Washington

(Continued from page 537.)

This group of buildings, all of which are of the most substantial construction are all but completed and the treatment has provided a dignified water approach to the national capital.

The gigantic plan now working out contemplates the devotion of the rather squalid portion of the city lying between Pennsylvania avenue and the Mall to buildings for municipal purposes and like uses and a notable beginning in the reclamation of this territory has been made by the devotion of one entire square as a site for the District Building or City Hall of Washington. The structure is of white marble construction and the walls have at this writing been completed to the height of the second story. It is possible that Pennsylvania avenue in the vicinity of the Treasury Building may also afford a site for a great building which will provide a home for the State Department, the Department of Justice and the newly created Department of Commerce and Labor but Congress in the closing hours of its last session struck out the item of $3,000,000 which had been provided for this undertaking so that the prospective location of this public building is in doubt although the imperative need for the structure seems to presage its early construction.

As previously stated the present enterprise for the improvement of Washington—a city which is equaled by no other in the world in architectural possibilities—concerns itself not merely with the treatment and location of public buildings but also embraces the extension of roads, the enlargement of the park system and the beautifying of the waterways of the District of Columbia. Among the latter phases of the undertaking is the contemplated realization of the scenic possibilities of the palisades of the Potomac. The Mall is the center of the vast new park system and boulevards will connect it with the National Soldiers' Home, the National Zoological Park and other notable "show places" lying in the outskirts of the city in one direction or another. A number of new bridges have also been constructed or are under way to supplement the activities in other directions and among these is the graceful structure over Rock Creek Park—the largest concrete bridge in the world. On the west of the Capitol there will one day be provided Union Square, a space resembling the Place de la Concorde in Paris and this area will be adorned with statues, notably a splendid $250,000 memorial to Gen. Grant, for which provision has already been made.



Three Well-Planned Houses

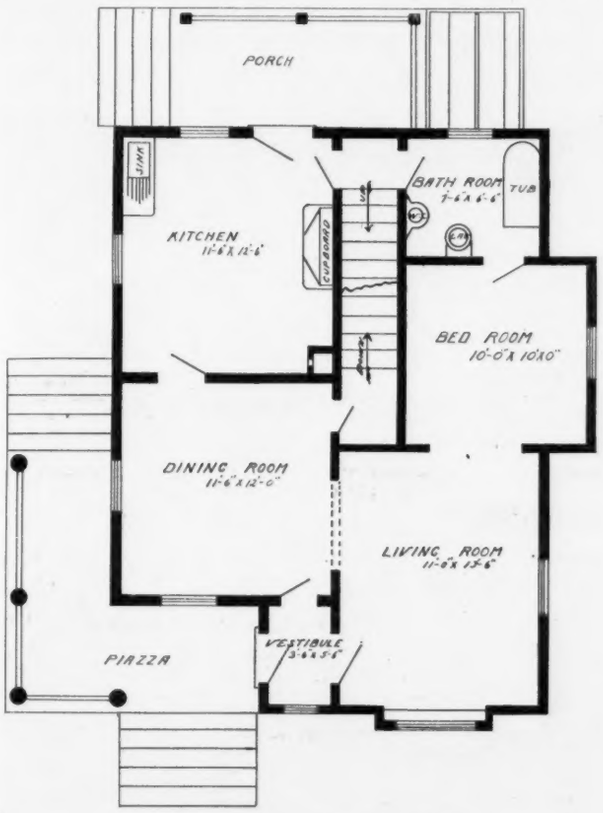
PERSPECTIVES AND FLOOR PLANS OF THREE MODERN HOUSES—INTERIOR ARRANGEMENT OF EACH AND APPROPRIATE COLOR SCHEMES

THE house shown on this page was designed by Clarence H. Rush of Mineral Point, Missouri. This house is intended for a small family, but the second floor can be divided into a number of rooms should the occasion demand. The basement under the house is arranged so that it can be used for a laundry and storage room. The exterior is of colonial yellow with a white trim. There is a shingled belt around the house and the gables are also shingled and stained a silver gray. The front windows are lattice glazed. The first floor is divided into a living room, dining-room, bedroom, kitchen and bathroom. The interior finish is of yellow pine finished in the natural color. The ceilings are 9 feet on the first and second floors. For a small family this is a very nicely arranged house and affords all modern conveniences. The two porches add very materially to the appearance and comfort of the house.

A Southern House

The house shown on page 554 was designed by Chas.

P. Rawson, Fort Worth, Texas. It is a type of house built quite extensively throughout the South, and as our object is to make our suggestions in designs of general interest it was thought advisable to publish one especially for that section of the country. The outside finish up to the sill is of one by twelve-inch resawed boards, which could be stained tobacco brown.



Plan of House on Page 552

From the sill belt to the bottom line of the frieze the finish consists of gray plaster, and the trimmings, such as casings, cornice and belts, are cream white. The roof has moss green shingles, producing altogether a very pleasing effect. The wide cornice, which projects quite considerably, adds to the beauty and also tends to keep the sun away from the windows and so makes the house cooler. The inside trim is of clear cypress, which can be tinted to suit the owner's taste, or it can be finished in oil natural. Cypress is being used quite extensively as a substitute for clear white pine, as this is now out of reason for low-priced houses. We would suggest here that it is advisable to put on the first coat of finish on cypress as soon as it is cleaned and delivered as the least moisture has a tendency to raise the grain.

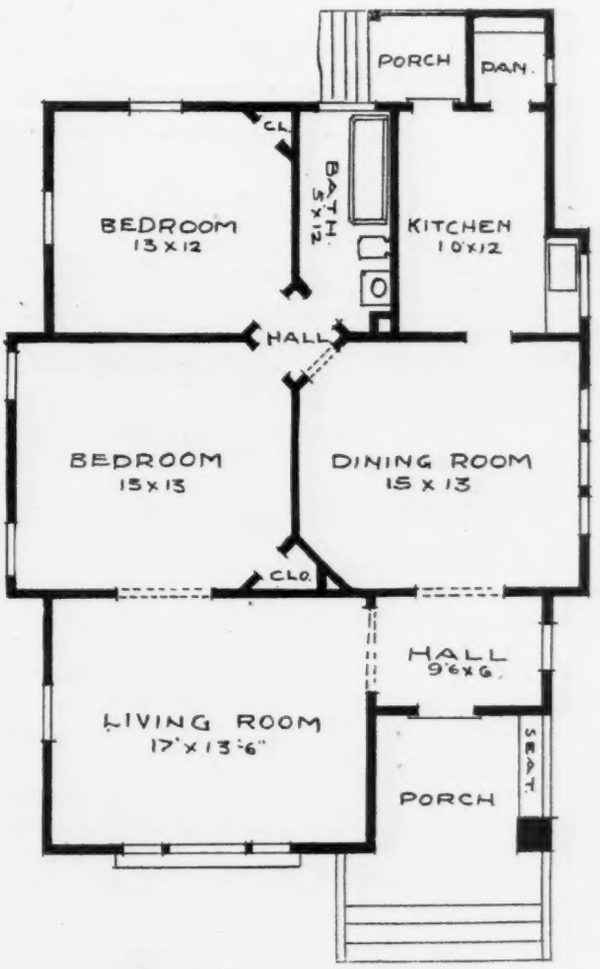
A Desirable Residence

The elevation and floor plans of residence shown on page 555 were prepared by J. G. Cordner, architect, of Lincoln, Nebraska, and shows him to be a very neat and painstaking draftsman.

The elevation shows clearly how the work will appear in the completed building and all blending in pleasing proportions. Mr. Cordner has planned many residences and public buildings and his work speaks for itself.

The house contains a full basement under the entire building, conveniently divided into laundry, vegetable cellar, furnace and fuel rooms. The basement wall is of brick up to the grade line and from there it is of cement range blocks up to the water table. The first course of which projects beyond the face line of those above dropping back with a wide wash to the building line. The next two courses are of rock-faced cement range blocks. The porch piers are also of plain cement blocks up to the baluster rail and that part below the porch and between piers is of brick and stucco work with an oval arch with rock-face blocks.

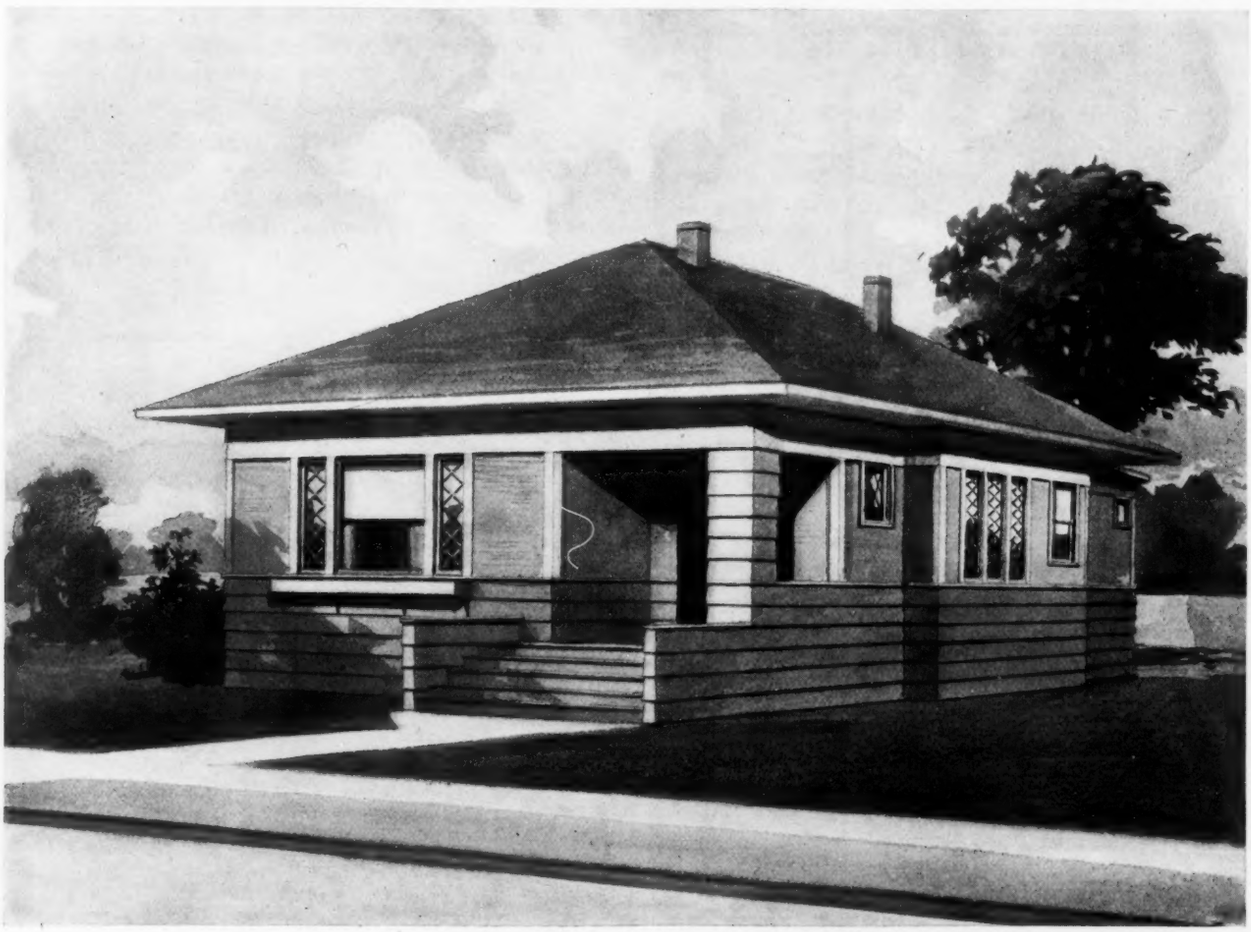
One nice feature in the elevation is the appearance of a circular bay window, but upon referring to the floor plan it will be seen is an extension of the dining-room. It is 19 by 12 feet in size and oval in shape, with a large fireplace at the other end. At one



Plan of House on Page 554

side of this room are sliding doors opening into a living-room, while on the other side is arranged a built-in sideboard and china closet and adjacent to the pantry. A side entrance is also had with the dining-room, through an entry-way, which contains a

built-in seat. The pantry is large and well lighted and contains cupboard, work table and large ice box, with outside door. The kitchen is also roomy and convenient. It has a built-in range, with hood for carrying off the odor from the kitchen, built adjacent to the fireplace, and the one large chimney answers with its several flues for the whole house. A back stairway leads from the kitchen to the second landing of the main stairway. An outside doorway at grade leads to the basement and also to a passage-



way between the reception hall and kitchen. The reception hall is separated from the living room by a columned archway. The stairway leading to the second floor is wide, simple in construction, yet pleasing in appearance.

The second floor has four bedrooms, a sewing room and two bathrooms. Each room is provided with ample closet room. All of the rooms and one bathroom open from the one small hall. A stairway from this hall also leads to the attic, where two large rooms are provided for, as well as storage closets, etc. Taking it all in all, it is seldom that a house of this size is so well arranged. This house can be built with good interior finish for from $3,500 to $4,000, according to the locality in which it is built.

✤

Invariably he who borrows trouble gets the worst of the transaction.

Buildings in Philadelphia

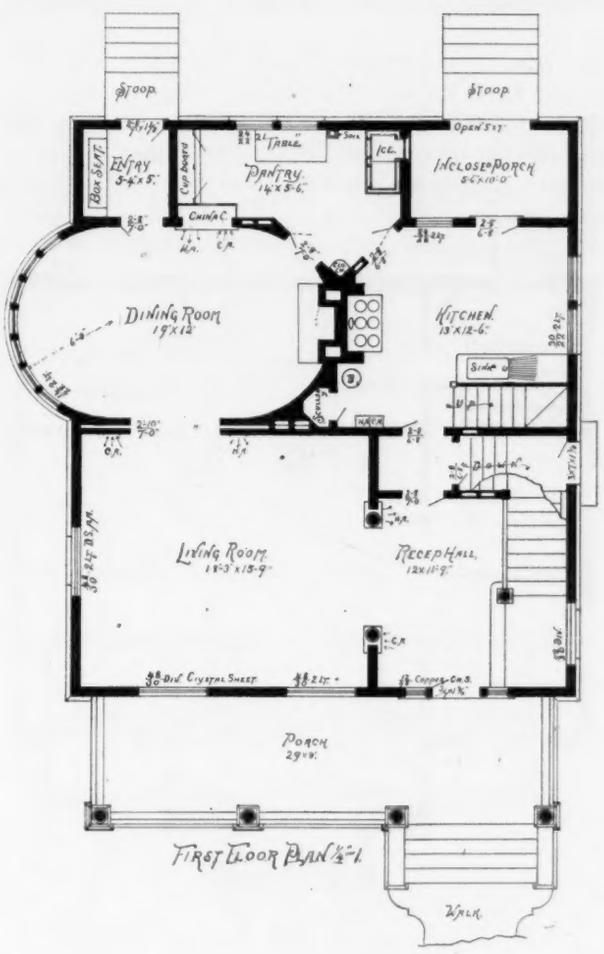
Statistics recently compiled tend to show that Philadelphia is the best housed of the big cities of the country, there being an average of only five persons to a dwelling. According to the official returns just computed, there are 290,701 dwelling houses within the confines of the 43 wards of Philadelphia, 5,482 industrial plants of all kinds, 818 churches, 308 public schools, 88 bank buildings, 647 buildings used for office purposes, 305 structures occupied by benevolent and charitable organizations which are free from taxation, and 135 buildings for the manufacture of malt and spirituous liquors. The compilation, which is based on the figures up to January 1 of the current year, shows an increase of 10,006 structures for the year, of which 8,584 were dwellings.

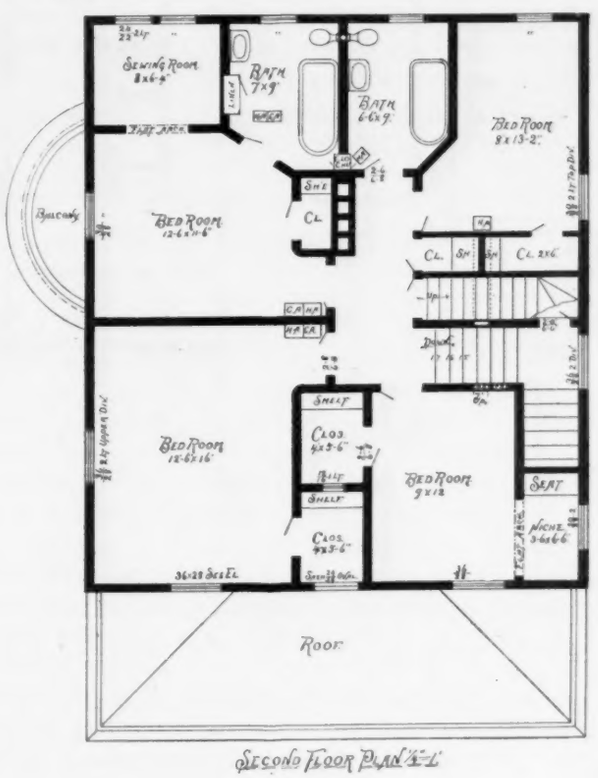
✤

Preservation of Wood

To protect wood by means of sulphur the following must be observed, viz: Sulphur is fused in a befitting receptacle, making use of steam to avoid an excess of heat, which deteriorates the sulphur. Into this liquid, and at a temperature of about 140 degrees, are steeped the boards which are to receive the treatment, care being taken to immerse them completely. The foam which gathers at first, called forth by the separation from the wood of the air and humidity it contains, disappears at the moment the wood thor-

oughly assimilates the temperature of the bath, which is then lowered to 110 degrees. At this point the sulphur becomes hard and, while the air contracts itself, the sulphur penetrates into the fibrous tissues, propelled by atmospheric pressure. The boards are then slowly withdrawn from the bath, allowing a thin and even coat of sulphur to form and cover the wood, as any superfluous surcharge can be removed only with the greatest difficulties afterwards. This coat of sulphur has a vitreous appearance and forms a very tenacious crust, excluding all tendencies to chip or break.

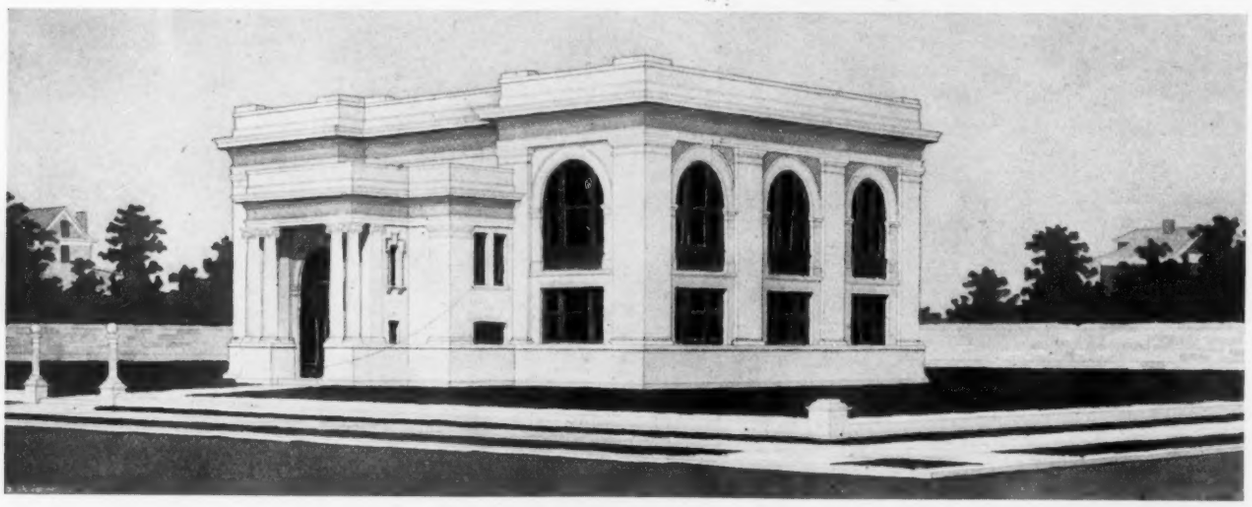


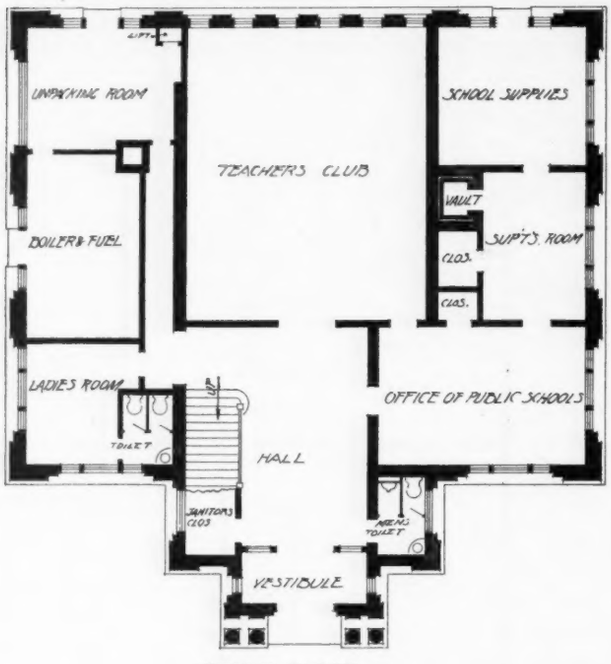


A Study in Libraries

TWO DESIGNS SHOWING DESIRABLE FEATURES ABOUT LIBRARIES—VALUE OF A PUBLIC LIBRARY TO A TOWN

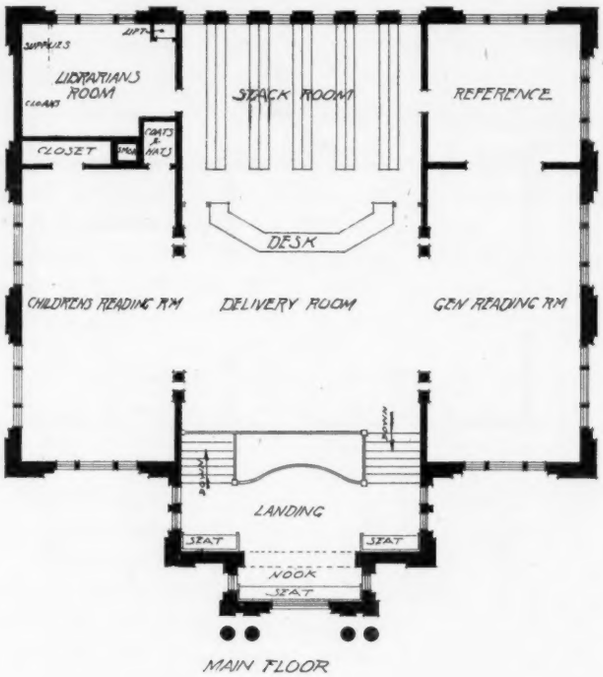
WE ARE this month publishing the perspectives and floor plans of two public libraries designed by G. W. Ashby, architect. This is done with the idea of giving the carpenters and builders new ideas along these lines as they are beginning to be called upon more and more to design them for their own locality. The people are beginning to realize the value of a public library in their community for reference and other educational purposes. This is especially so where it is erected by their own efforts and money, for they must then make a sacrifice to secure it and the result is that they appreciate it more. Anything that you are obliged to work for is always more enjoyed and appreciated than something that is given to you. Many people are unable to have an extensive library of their own and to these and their children it is of special benefit. A library should not be looked at with fear and trembling but rather as a place of good, wholesome enjoyment. It is an ideal place to spend an evening or the books can be drawn from the library and be enjoyed in the home. Men who have done manual labor all day will find nothing more restful in the evening than spending an hour or two reading some interesting and instructive book. It is not work, for it is a complete change to what you do in your daily work. That is the reason men who are obliged to do head work all day make it a point to get some physical exercise for an hour or two in the evening.





GROUND FLOOR

Make yourself familiar with the contents of your



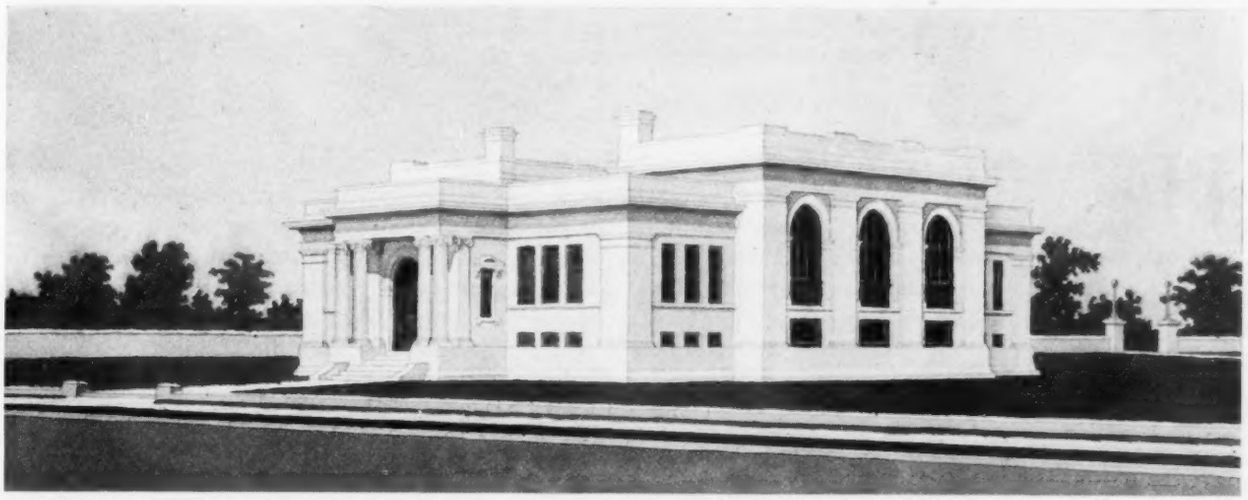
MAIN FLOOR

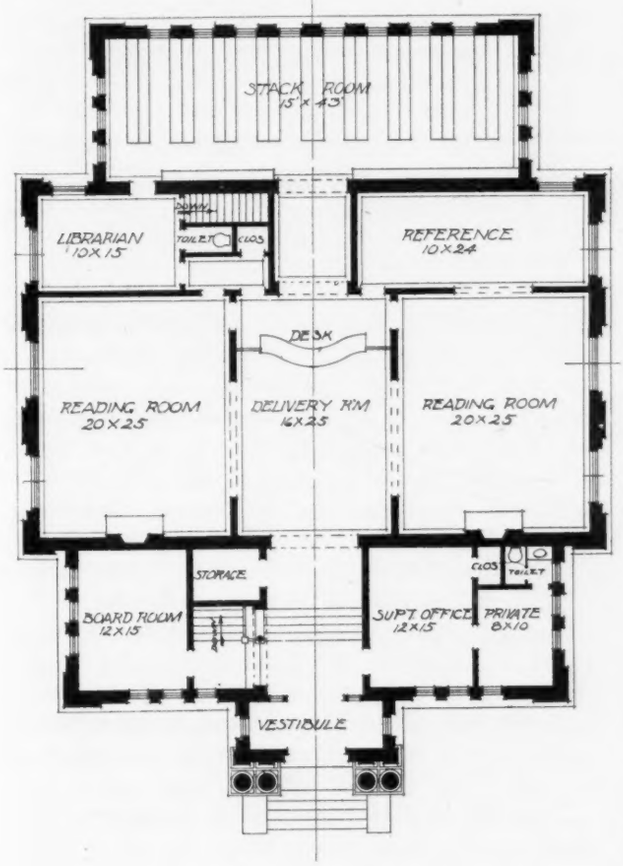
library, for it is your library as much as any one else, and if the books which you are interested in are not there tell the board about it and see that they get them.

When you have decided to build a library see to it that it is a credit to the town, not necessarily a needless outlay of money, but make it a building to be proud of. Make it a building that will harmonize with your school house and city hall and don't think that any kind of a building will do.

We are therefore publishing these designs and will continue to do so, to suggest ideas along these lines, designs that will answer your purpose and that can be built reasonably and still be a credit to your community.

The designs shown here are constructed of light colored brick and have concrete foundations. The entrances are made more effective by a number of Ionic pillars which add very materially to the appearance of the building. The interior finish is in stained cypress and the floor is of composition cork. The reason for this is that it is noiseless and this is one of the things which is absolutely necessary in a building of this kind. It is no pleasure reading or studying if every passing footstep takes your mind off from your book and so it is found very advisable installing these composition cork floors. The inside arrangement is one which will be most convenient. The ceilings are all high so that long windows can be used; this is for the benefit of the reading room. These high windows will diffuse the light throughout the room and make all parts of it desirable. In the reading rooms there are long tables around which the readers may sit and along the wall are files for newspapers and periodicals. It is a good plan to have a system about the files as it prevents a great deal of confusion.





Amount of Standing Timber

The total amount of timber now standing in the forests of the United States is estimated at 1,475 billion feet, but the annual cut per year is 45 billion feet, which would mean the total destruction of the forests in 35 years, not counting any increase in the cutting. In this connection it is interesting to observe that the building trades in this country must shortly look toward a substitute for wood in many of the operations, and it is considering, too, the advancement that has been made in sheet metal stamping it is not unlikely that sheet metal of various forms will be more largely used than concrete which is at the present playing such an important part.

One of the most difficult obstacles to overcome in business and social intercourse is the man who is ignorant of his ignorance.

Short Talks With Our Subscribers.

HAVE you noticed the department of "Classified Advertisements" which we have been running in the AMERICAN CARPENTER AND BUILDER the last few months? This promises to be a most helpful and popular feature with our subscribers, as in this way they will be able to supply their wants at a very moderate cost. It is surprising in how many ways a department of this character may be made useful.

How to Sell or Buy Machinery

You may have bought a large machine of some kind to replace a smaller one which your business had outgrown, and the old machine is relegated to a corner where it not only is a dead loss but occupies valuable space which could be used to profitable advantage. Did you ever realize that this machine could be turned into cash through a little advertisement in the "Classified" department? Some other man may need a machine of just that size and would be very glad of getting one almost as good as new, at an attractive price which you, under the circumstances, would be willing to make. Such an advertisement could be put into three or four lines and would cost but 45 cents a line, or three months for $1.25 a line.

How easy it would be for our subscribers to help each other in this manner. Some man who is running a planing mill or a carpenter machine shop realizes he needs a larger machine or a different machine, and says, "If I could only dispose of this machine I could afford to get just what I need. The machine is just as good as new and would be just the thing for a fellow in a smaller town. I wish I knew how to get hold of such a fellow."

Then there is "the fellow in a smaller town." He is thinking, "If I could only afford to buy a machine to do this work I could turn out three times as much at a better profit. There must be second-hand machines of this character that I could buy cheap if I only knew where they were. I wonder how I can find out?"

The answer is easy. The first man spends a dollar or two for a little advertisement under "For Sale" and sells his machine. The second man puts in a little three or four-line ad. and buys a machine. Both are better off financially and both are happier—all through a little advertisement in the "Classified" department of the AMERICAN CARPENTER AND BUILDER.

How to Exchange Tools

This department of classified advertisements can be used to not only buy and sell machines, or materials, but it can be used to exchange anything that a carpenter or builder has that another carpenter or builder might want. Perhaps a carpenter may have some tool that a change in his work has made it necessary for him to lay aside. There may be some other tool that this same change makes it necessary for him to have. A little advertisement does the business. Some other fellow has the tool you want and you have the tool he wants. Just let it be known to our 28,000 readers and the thing is done.

Do You Need Help?

You may be having the same experience that other contractors and builders have at times. You have plenty of contracts but very few men are available. There are thousands of workers in all lines who read our magazine and every man is looking for an opportunity to better himself. Frequently men are idle in one section of the country when they are busy in another. These men would be only too glad to know that you needed them. Just three or four lines is all that is necessary to make your wants known; good men are secured and the worry is over.

Is It a Situation You Want?

If you are out of work, or if you would like to change to some other section of the country or to a better position, think how easy it would be to let thousands of employing contractors and builders know of your wishes. They are reading the magazine every month and many of them are looking for good men.

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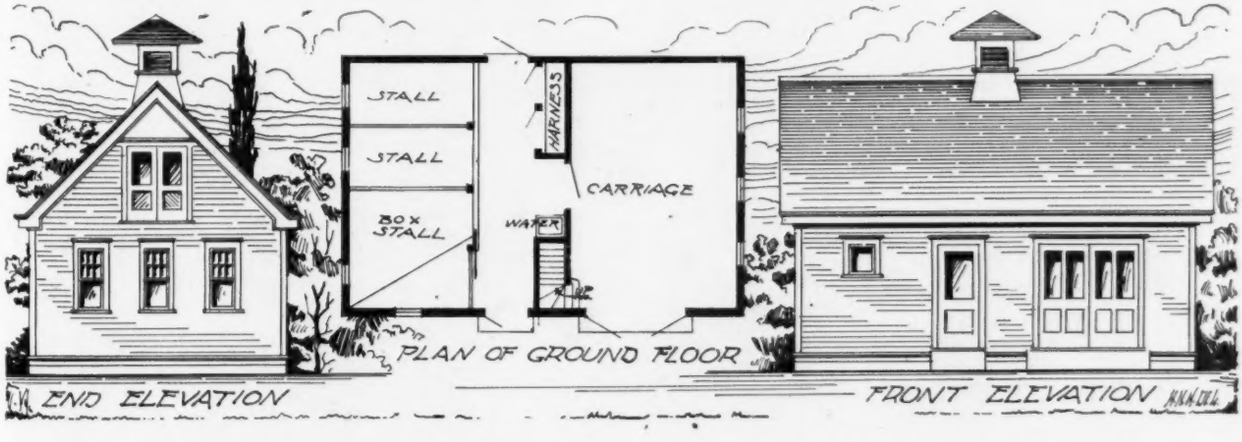
Two Serviceable Barns

ELEVATIONS AND FLOOR PLANS SHOWING INTERIOR ARRANGEMENT — COMPLETE DESCRIPTION OF THE FINISH OF FLOORS AND WALLS

ON THIS page we are illustrating a small barn, which is twenty feet by thirty-two feet, and contains a carriage room thirteen feet by nineteen feet, which has large double doors in front that will admit the largest size carriage, a wide single door to the horse stable, and a stairway leading to the upper floor, which is for the storage of hay, feed, etc., and will admit the installation of a man's room if it is desired.

This barn contains two single stalls and a box stall.



Each stall has a direct window, which is high enough from the floor to avoid too much draft on the horses and is protected by a wire mesh guard.

This barn has been designed for utility and is practical in every way. The arrangement is convenient, and it is of a neat appearance on the outside. If painted a stone grey, with all trimmings and cornice work painted pure white, it would be a credit to any neighborhood.

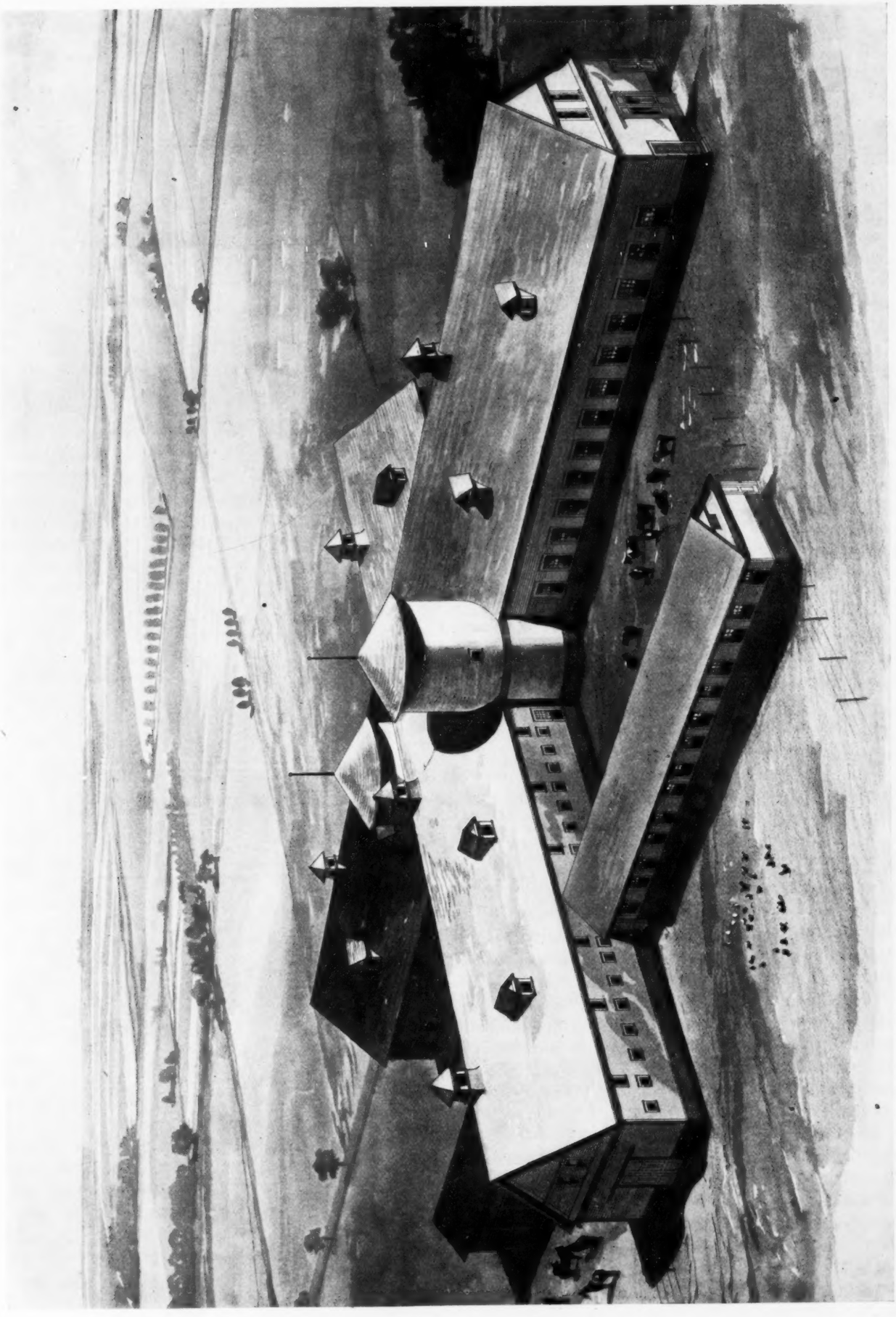
The carriage room has a cement floor, which is slightly pitched from all directions down to the center, where it is provided with a floor drain. This will admit the carriages to be washed any place in the room without injury to the floor and the side walls, which are wainscotted with Portland cement to a height of two feet six inches.

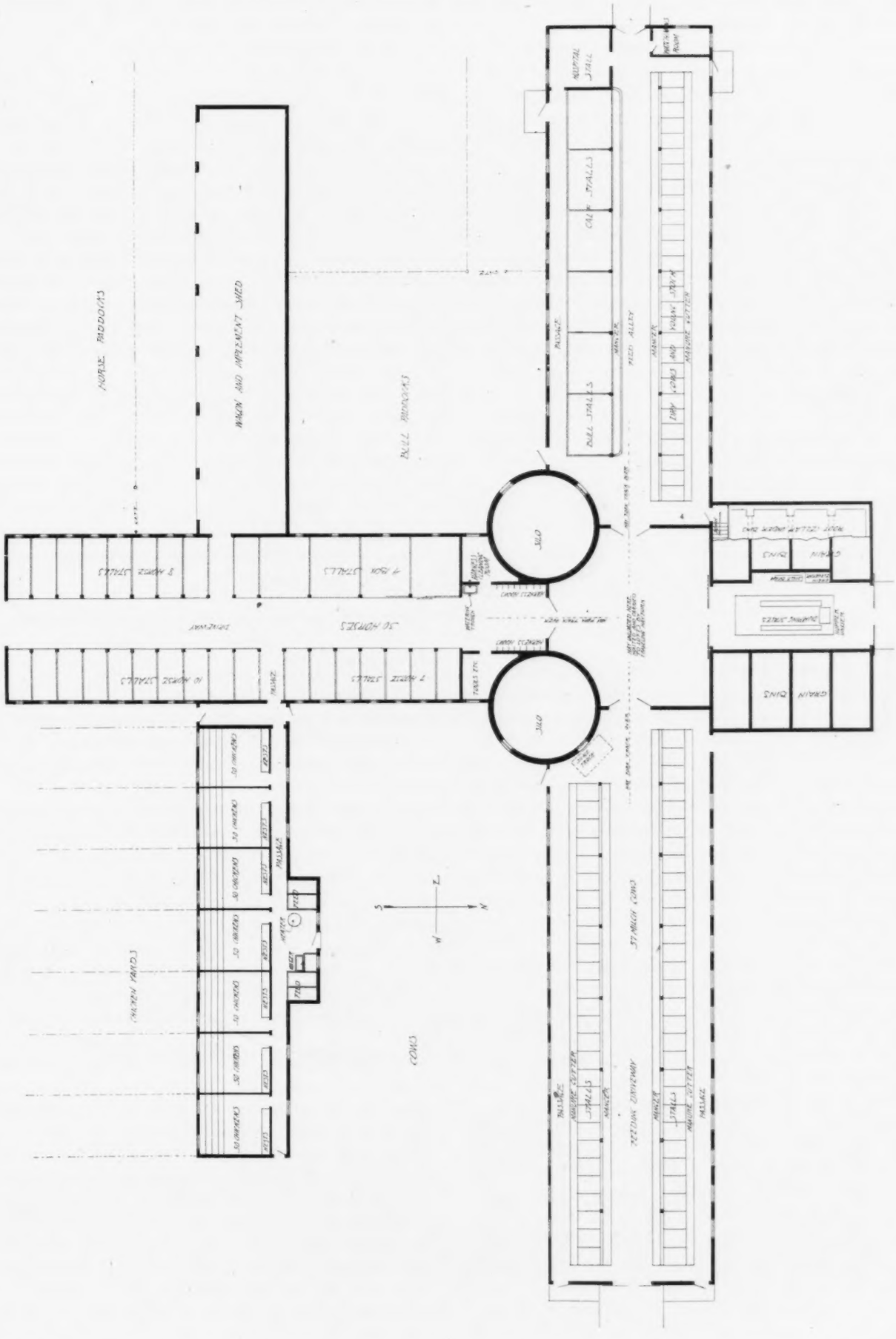
All the walls of the first story and the ceiling are finished with clear Southern yellow pine, beaded ceiling, with two coats of hard oil. This makes a very pretty effect for a stable and is at the same time very serviceable. The stall floors are of double thickness one and three-quarter inch floors. The first floor is tongued and grooved, tightly laid, and then covered with hot tar. The upper floor is then laid and has slightly beveled edges, so that when laid the boards will fit tightly together at the bottom and leaving about an eighth of an inch crack on the top surface, which is then filled with hot tar. This construction makes a very durable and sanitary floor. The entire stall floor is pitched slightly to the rear to a cast iron gutter with perforated cover and connected with the catch basin and sewer. The second floor has ample storage room for a winter's supply of hay and feed for three horses and is of strong construction. The roof is of shingles and the ventilator on top gives the building a completed appearance.

A Canadian Barn

On page 560 we are illustrating a large stock and dairy barn which has been designed for a large Canadian farm and has many good features worth noting, both from the builder's and the dairyman's point of view.

The shape of the building was developed with the view of giving the best shelter to the stock. From the points of the compass, as shown on the floor plan, it will be seen that the wings of the cow barn and




HORSE PADDOCKS
WAGON AND IMPLEMENT SHED
BULL PADDOCKS
SILO
SILO
50 HORSES
8 HORSE STALLS
7 BOX STALLS
10 HORSE STALLS
7 HORSE STALLS
DRIVEWAY
PASSAGE
WAGON YARDS
COWS
BULL STALLS
COW STALLS
MANGER
FEED ALLEY
HOSPITAL STALL
GRAIN BINS
SILAGE STALLS
FEEDING DRIVEWAY
MANURE GUTTER
PASSAGE
N
S
E
W

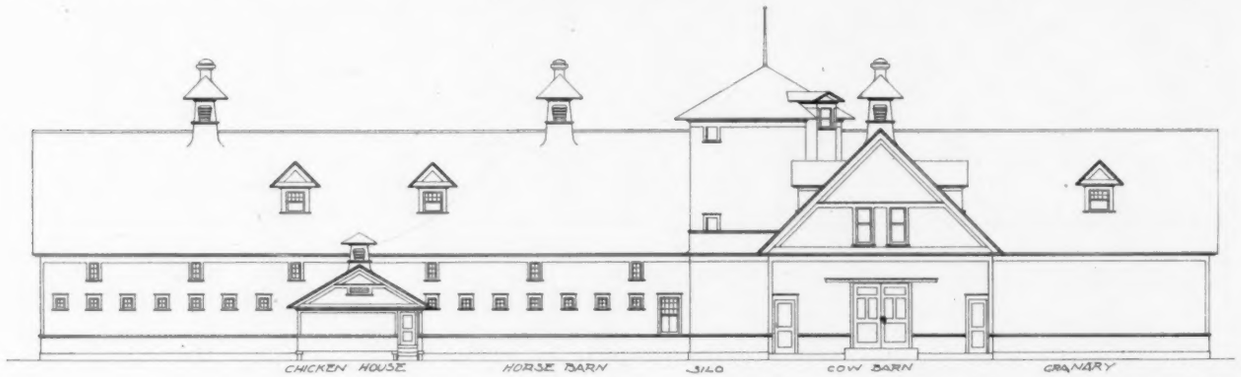
the young stock barn are so situated as to keep the north wind off the stock when it is let out for exercise during winter months, and at the same time giving them all the sunshine. The building is also arranged to be convenient from the paddocks, pastures, etc., allowing the stock to approach their respective stalls without having to be driven across unnecessary driveways or through a series of gates.

The building is built of wood, on a foundation of concrete which is put in place by excavating the trenches the exact width and depth of the wall and then the concrete is dumped and tamped into the trench, thus avoiding the work and expense of planking for concrete forms below grade. Above grade the concrete is tamped between planks well fastened in place in the usual manner. The concrete wall extends up to the floor level where the wood construction begins. The space between the studding from the floor up to the window sill level is also filled with concrete after the walls have been sided with drop siding over a layer of thick tar paper. After the concrete between the studding has become hard metal lath are put in place on the interior face of studding and over the concrete, which is then plastered with cement mortar, making a cement wainscoting around the walls, which makes a perfectly sanitary barn. The concrete filled wall helps greatly to keep the barn warm in winter and cool in summer as well as to stiffen the structure against heavy winds.

The granary is located at the center of the north side and contains eight large hopper bottom bins for the storage of grain and feed. The bottom of each bin is connected with a spout leading to an elevator boot in basement, which elevates the grain to a revolving head so that the grain can readily be transferred from one bin to another or onto a truck or wagons. Some of the bins also have spouts wagon-bed height above the floor for feeding purposes. The main driveway of the barn goes through this granary and contains a combination dumping scales with a hopper under the floor spouted to the elevator boot for loading grain into the bins.

This granary being located near the center of the barn is very convenient for feeding the stock and adds to the exterior appearance of the building. The basement of the granary is used for the storage of roots for the stock and can be equipped with a kettle for boiling and mixing foods, etc.

The cow barn contains 57 cow stalls and arranged with a feed alley running through the entire length with the mangers on either side, so the cattle can be conveniently fed from a truck or a trolley track system suspended from the ceiling. The cows stand facing each other and the mangers are continuous, constructed out of concrete which forms part of the cement floor. The stall floors are of concrete covered with plank, which can be taken up and cleaned or renewed when desired. The manure gutters have sufficient fall to drain all liquids to one outlet in the center which is connected with a catch basin, and also contains gate valves so arranged that while scrubbing the water can be switched into the sewer. The passages back of the cows are of good width for milking and bedding the stock and trucking out manure to platforms built at the ends of each passage outside of the building. The ventilation is well taken care of by ducts in the walls which carry the air to the ventilators on roof.



The young stock barn is located to the west of the cow barn and contains six box stalls for bulls and calves. These stalls are constructed from heavy wrought iron gas pipe, having three-inch pipes for corner posts and for top or header rail and 1½-inch pipe spaced 6 inches apart for the stall partitions; these pipes are set upright with the bottom ends well bedded in the concrete floor and the upper ends screwed into the 3-inch header. The gates are also of pipe construction and have self-closing locks and hinges.

There are 28 single stalls with swinging stanchions for calves, one-year-olds, and dry stock similar in arrangement to the stalls of the milk cows, only not so wide, as no milking room is necessary.

This wing also contains a hospital stall which is isolated from all others by solid walls and has all side walls, floor and ceiling finished with cement which is impervious to moisture and can be readily disinfected. Opposite the hospital stall is a watchman's room for a man who can attend any sick stock during the night.

The silos are centrally located for convenience in feeding and filling, as the silage cutter can be located in the central feeding room and thus be operated in

all kinds of weather during the ensilage season. The silos are constructed of studding spaced 12 inches on centers, sheathed on the inside with two thicknesses of 1½-inch by 6-inch sheathing bent around horizontal and then veneered on the inside with hard, vitreous paving brick laid in cement mortar, each brick being tightly pressed against the sheathing so that the silage pressure can not force it out of place. The exterior of each silo is finished to match the balance of the building. The silos have a concrete foundation which is flush on the inside with the face of brick lining, and being excavated down to the footing increases its capacity by about 50 tons. The floors are of concrete, dished to the center, and connected with a deep seal trap and drain.

South of the silos is the horse barn, which contains 17 single stalls on one side and 9 single and 4 box stalls on the other side, giving it a capacity of thirty horses. Each stall has an outside window for light and ventilation. These windows are about seven feet from the floor to avoid draft on the animals, and protected by a wire mesh guard. The stall partitions are of wood to a height of 5 feet 6 inches, above which there are wire mesh guards, giving a good circulation of air and light. The stall floors are of double thickness of 1¾-inch by 6-inch flooring with several thicknesses of roofing felt laid in hot tar between. All stall floors are slightly sloped down towards the driveway and have cast iron gutters with perforated cast iron covers and connected with catch basin and sewer.

East of the horse barn is the chicken house, having a capacity of 350 fowls, divided into seven compartments of 50 each, so arranged that the chickens get the south sun and protected from the cold north winds.

East of the horse barn is the shed for wagons and farming implements with a door into the horse stable so the team can be taken directly from the stable into the shed and hitched up without having to go through a barn yard.

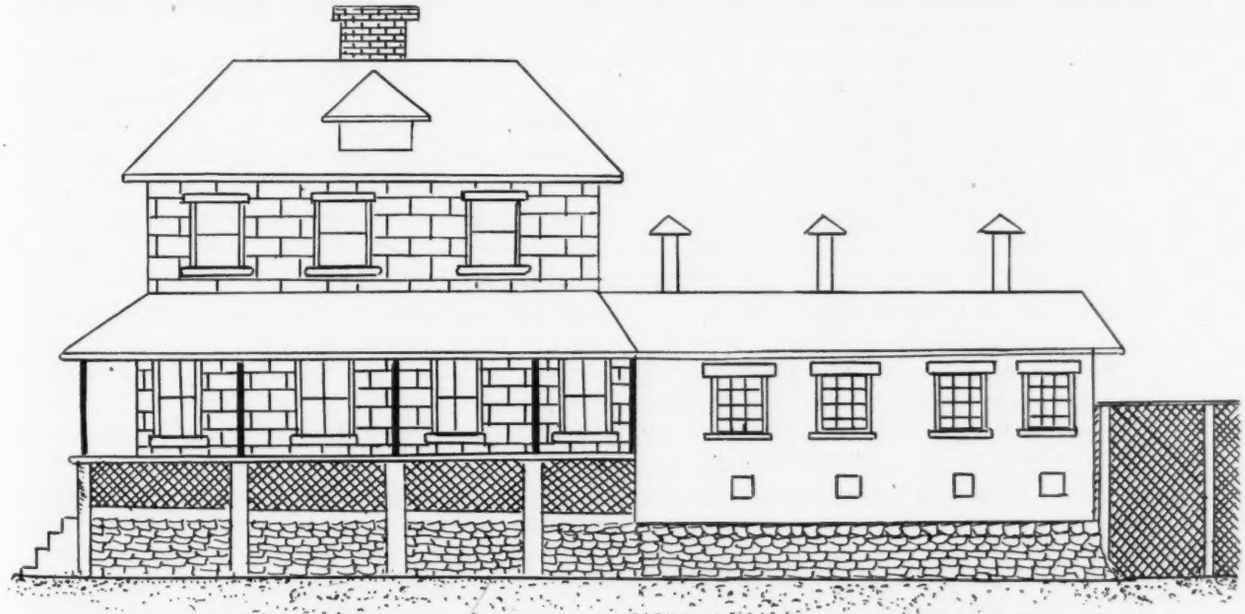
There are many other conveniences about this building but we must refrain in this article for lack of space. Suffice it, therefore, to conclude in stating that the building is so constructed that any department of the same can at any future time be extended or added to without in any way detracting from its appearance nor changing the present arrangement and conveniences in the least.

Modern Poultry House

AN ODD, INEXPENSIVE HOUSE BUILT ALONG MODERN IDEAS — METHOD USED TO MAKE POULTRY RAISING PAY

By George H. Melrose

A FRIEND of mine thought that he would try a new idea in the design of what proved to be an inexpensive and attractive modern poultry house, although constructed very like a dwelling place. We will call my friend Mr. Smith for short. Mr. Smith had been engaged in the poultry business all his life. He had operated small poultry farms in various parts of the country. Although a hard working, steady man, he had failed to accumulate much property. He had owned and managed poultry houses on the usual conditions. His fowl were clean and the products sold readily at prevailing market prices. But Mr. Smith realized that the poultry business, like nearly all other lines of business, was as-

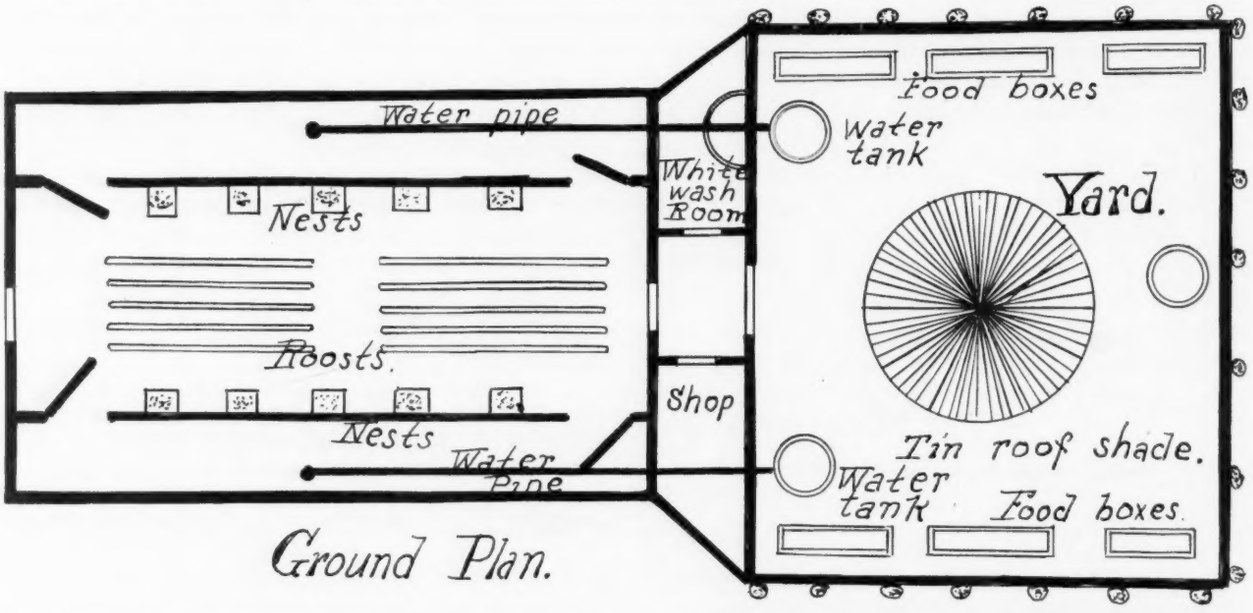


The henhouse that looks like a dwelling

suming new ideals. He noticed that the everyday poultry farmer was fast losing ground, whereas someone with a new feature to attract business secured the richer returns and made money. Smith planned a poultry establishment, which, from the roadway passing his place, possessed all the appearances of a first class dwelling. We give a view of it in diagram I. First the foundation was put in with rock secured on Smith's place. Smith discovered a quarry-like condition on his property and hired several men to break stone for the foundation.

The walls were built by excavating trenches four feet deep, so as to secure a good base. The small stone were piled into these trenches and the larger rock built up with cement on top. The ground proper was not disturbed, except under that portion occupied by the two-story part of the building. Here the cellar was put in and storage made for eggs, etc. The house portion was erected first. Here the office and store rooms were put in, on the lower floor, while the upper floor was arranged for lodging apartments for the help. The interior of this part of the building was fitted up very like the interior of any dwelling, except that several store rooms and apartments for special purposes in connection with the storage and sale of eggs and poultry were put in. The front lower room was fitted up as a sales department, and in this a counter was put, with showcases for exhibiting eggs. A part of this room was divided off for the sale of poultry. When Smith undertook to construct this part of the establishment it was supposed that the expense would be greater than the thing was worth. But cheap material was used throughout. The rooms were not finished off. The building was simply made tight and comfortable. Sheet metal was purchased and used for covering the sides of the building. In fact, the building was nothing more than an ordinary barn-like affair, with the sheet metal covering, the windows and the porches added.

Smith bought a number of window sash at auction and utilized these in the building. He looked about a bit and found some doors that had been ordered by a contractor who had failed and he bought these at moderate cost. The railing for the porches was made so that the ordinary wire fencing material could be used. This, when properly painted, was attractive and neat. Smith got a building erected that served to advertise him well. His patronge commenced as soon as he had the house portion of his hennery erected and the sign out in front, "Modern Poultry House. Fresh Eggs."



Ground Plan.

The next portion of the structure to go up was the part to receive the poultry at night and during stormy weather. A heating plant was put into the cellar of the house and heat was carried to the hen house by means of hot water pipes. Thus Smith could keep the poultry house at the right temperature during cold weather.

The ground plan gives an idea of the arrangement of this portion. The rear door of the house joins the poultry room section, so that entrance is made without passing outside. The water pipe system of the house is extended to the water tanks of the yard so that fresh water can be secured by simply turning the valves. The roosts for the poultry are arranged along the middle section of the poultry house. The nests are placed along the same line. Dropping boxes are used below the roosts and these are emptied every morning. Like all well furnished modern poultry establishments, there is a carpenter shop and whitewash room attached. These apartments are arranged at the end of the poultry house nearest the yard. The whitewash room is furnished with the necessary tubs in which to mix the liquids for whitening the interior of the poultry house about once a month. The carpenter shop has in it a bench and a selection of tools and hardware for the necessary service of the plant.

In an establishment like this one man has about

all he can do to keep things in order. In the yard for the poultry arrangements are made for ample room. The yard proper is built with wire fencing, secured to posts set into the earth deep enough to assure firmness. The wire netting is high enough to discourage energetic fowl from trying to fly over. Inside the yard the feed boxes are arranged in serial order, so as to give the fowl plenty of room to get at the food. A feature in the yard is a large circular tin roof affair, used for a shade for the poultry in summer. This looked to me more like a band stand than a poultry shade. Yet Smith expended but a trivial sum of money in the erection of this cover. Simply a few posts arranged in a circle, with wood connection, set up to the proper peak, on which the sheet tin is tacked.

Smith got his establishment into operation and business increased while profits were larger. We have not gone into details of measurements and capacities for the reason that any one undertaking to build along these lines would govern the dimensions to suit the number of poultry he cared to handle.

Exterior Painted Decorations

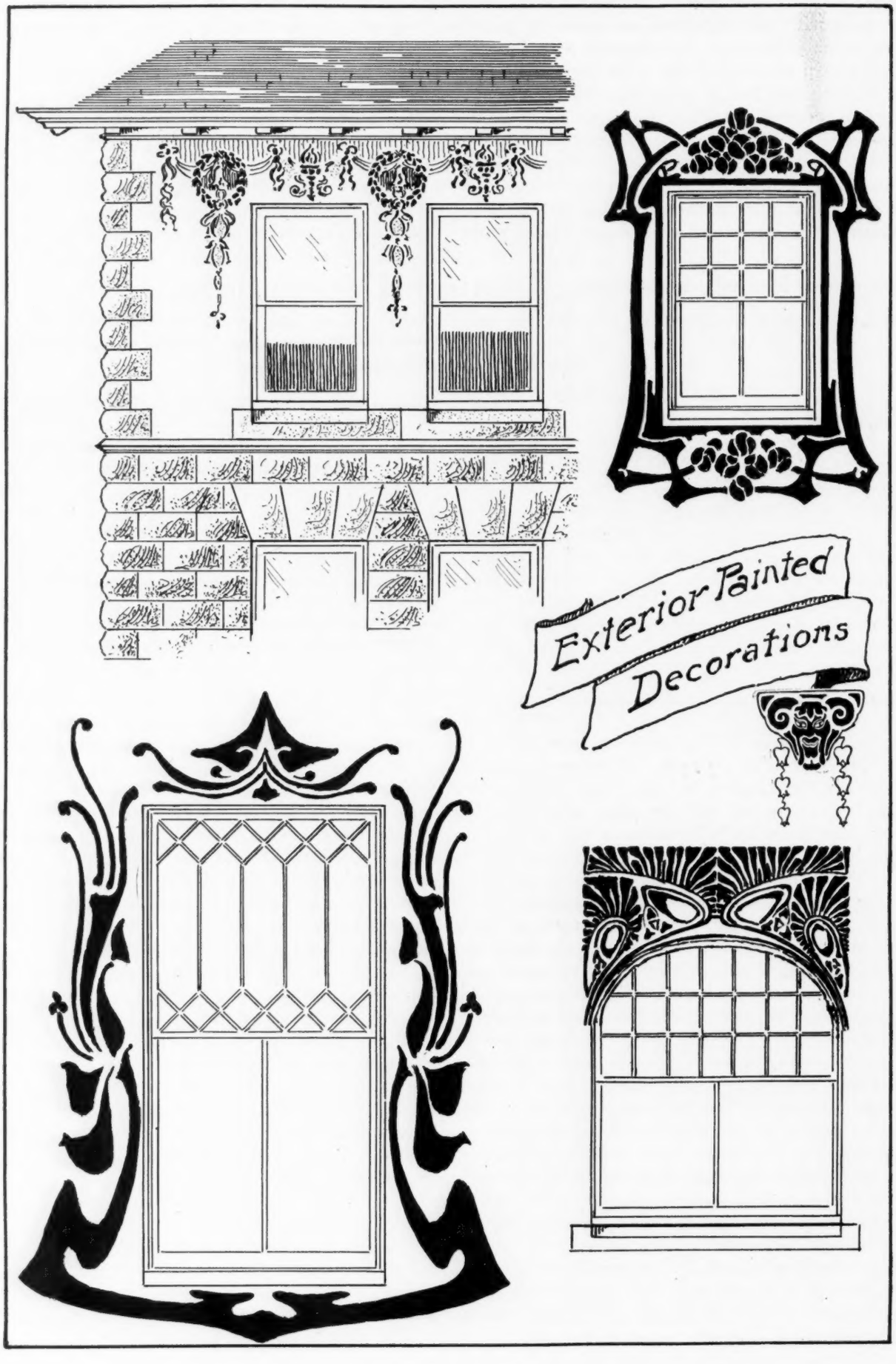
SHOWING HOW CEMENT BLOCK CONSTRUCTION MAY DEVELOP A NOVEL IDEA—SUGGESTIONS GIVEN AS TO HOW THEY CAN BE DECORATED

By Sydney Phillips

NOW that cement block construction seems to have obtained such a firm hold, because of its economy and the greater safety from fire, there is an opportunity waiting for our builders and architects to strike out into new lines and develop a style of decorated architecture that would be entirely new in this country, although a modification of something which may be found in many parts of Europe, especially in Germany and Italy. In these countries, where a large number of the houses are built of rough brick or stone, covered with cement or plaster, it has long been the custom to paint upon the white surface of the house, decorations in various colors. In Italy there is frequently seen a pictorial frieze painted in bright hues—blue, vermillion and strong yellow tones—under the boldly projecting eaves. Perhaps one sees figures of saints, or it may be flowers or fruit, or even landscapes, painted in hues more vivid than nature, but in contrast with the white plaster of the houses and under the brilliant blue of the Italian sky, these bright colors do not seem offensive. In Germany the treatment becomes more decorative and conventional ornament is used, the colors employed usually being duller in tone. Store fronts are very often painted with decorations illustrative of the character of the business. Heads of oxen or of sheep will appear on the front of the butcher's shop; the shoemaker will have quaintly conventionalized boots and shoes and the clockmaker may have the ornamented face of a sun dial, with a raised gromen of ornamental ironwork to tell the hours as they pass. It is on the eating houses and the beer halls that decoration runs riot. Here we see Gambrinus depicted, seated on a huge barrel or raising a goblet on high, or perhaps the decorations consist almost entirely of conventional grapevines with huge clusters of purple fruit. Even in grimy and smoky London, we see occasional efforts to relieve the gloom of the monotonous gray painted stucco fronts by stenciled diaperwork patterns, usually dividing the wall space off into block-shaped spaces, with perhaps a little flat ornament to relieve the monotony.

The bright, clear atmosphere of the greater portion of this country lends itself particularly well to exterior painted decoration and it is surprising how little of it has been done. One reason, perhaps, is the prevalence of frame houses; and the ordinary weatherboard surface, broken by sharp shadow lines of narrow width every four or five inches is certainly ill enough adapted to any decoration of the kind spoken of. Nor is the ordinary brick front much better, although the writer recalls one brick front in the business section of Newark, N. J., that until recently was admirably decorated with ornamentation in the German renaissance style. It may be well to add, however, that it was the front of a wall paper and decorating establishment. Painted pictorial wall signs are common enough, but the decorations spoken of do not partake of the character of a sign, even though, on a shop front, the name of the firm and perhaps the business, may be introduced in a ribbon scroll. In Philadelphia a painted frieze was introduced on the exterior of Horticultural Hall, and several store fronts showed painted decorations. But these examples are so rare as to be worthy of special note—doubtless a few can be found in almost any large city—while in Germany and Italy they are very common, not only in the cities but even in the smaller towns. It is not because we haven't the men capable of painting them nor that the cost of such decorations would be prohibitive—a glance at any of the high class bulletin or wall signs in our large cities is sufficient to show that the work could be well done at a reasonable cost, if it were wanted. The reason seems to be that our buildings have not, as a rule, been adapted for exterior painted decorations, and for that reason we have not had them.

So far our cement block architecture has been very crude, and no attempt has been made to do anything but imitate squared stones, usually with a rock face, although it would seem to the writer that a smoother surface, such as is produced by hammer dressing, would be more agreeable. But the cement block is capable of a modification so that it might be used for


Exterior Painted
Decorations

the creation of very artistic houses, which could be decorated by means of painted ornament that would add very much to their effectiveness. Many of the suburban houses round Philadelphia are built of brick or stone for the first story, while the second story is built of rough brick, covered with a coating of pebble dashed plaster, and occasionally with rough cast cement. Now if similar houses were to be built, using either rock face or merely roughened surface cement blocks for the first story, while the second story would be made either of concrete, or of framework with cement plaster or wire lathing, very artistic houses would result. Before long the cement block manufacturers would turn out blocks with grooved surfaces that would act as suitable keys for a smooth coat of cement, or of white mortar or plaster suitable for painted decorations. These could either be painted upon the wet plaster, using the methods of the old fresco painters, or they could be painted in oil, after the plaster or cement had dried. The greatest practical difficulty met with in painting upon a cement surface is the action of the alkali contained in the cement upon the paint, causing it to turn color or to chip off. Most people would not care to wait a year before decorating their houses, in order to avoid this difficulty; but it can fortunately be overcome by washing the surface with dilute sulphuric acid, in the proportion of one gallon of water to twelve fluid ounces of oil of vitrol. This turns any excess of lime in the cement to sulphate of lime and gives a uniformly absorbent surface to paint on. If the cement has been exposed to the weather for a month or so a wash made by dissolving two ounces of bicarbonate of ammonia to the gallon of water will prove more effective and the painting can be done as soon as the surface is dry.

But it is not necessary to wait until the cement block and concrete house is developed by the architects. Any brick city front that needs painting can be made more attractive by painting its surface in a light color and surrounding the windows with suitable decorations, or by painting a frieze underneath the cornice, than by painting the front to imitate pressed brick and carefully striping up the mortar lines. The expense will be but a trifle greater than the cost of lining the joints, while the effect will be much superior.

The Italian style or the English half timber style country houses are both well adapted to the use of painted exterior decorations, although they are also well suited to the plain surfaces of some of the more simple and severe colonial houses, or to the picturesque English treatments that many of our architects excel in. But whatever the style of architecture, the decorations must harmonize with it. In the accompanying illustrations an attempt has been made to reproduce in black and white the effect of some of these exterior painted decorations, or at least to indicate their possibilities. Of course the solid black of the ornaments shown in the illustrations seems much cruder and harsher than the reds, dull greens or blues which would naturally be used.

Furniture in Central Europe

The native woods of the southern and central part of Europe, in general, and the kingdom of Bavaria in particular, are limited in quantity and variety, and lack adaptability to furniture making, while all woods are very high in market value. Owing to this state of affairs, furniture in South Germany is extremely expensive. There is very little solid furniture made in the district of Munich, according to the American Consul-General in that city, practically all being veneered, and the veneer used is of poor quality, very thin and not durable. The result of the use of this thin veneer is that after a very little time it warps and cracks, and the furniture becomes valueless for ornamental purposes. Furniture dealers in and around Munich demand and obtain profits which seem incredible. The system of quick sales and small profits does not appeal to the more conservative Bavarian, who prefers to obtain a large profit on one sale, which causes him less trouble than a small profit on many sales. The system of long credits obtains in Bavaria. It is the custom for the tradesman to send his customer's bills about every six months, and many firms send out their bills only in the new year. This system naturally causes a larger proportion of bad debts, and therefore increases the cost of the goods sold; but department stores selling for cash in Munich are, by all appearances, doing a profitable trade. The Consul-General says that undoubtedly the best method of introducing furniture would be in a suitably-placed showroom, where tastefully-designed furniture of solid manufacture could be exhibited. The existing prejudice in Bavaria against machine-made furniture would easily be overcome when the people had the chance of examining the goods personally, with all their merits pointed out by an intelligent salesman.

Framing and Raising Studding

(*Continued from page* 549.)

which is only a little over 1½ inches to carry heavy 12-inch joist, and the joist spaced without any regards to the studding below.

While it is true that the joist will probably not break through the plate, still how much better it would be to space the joist so they came over the studding. In fact, it is not only much better, but it is much easier too, for you to simply lay off the sill and it is all carried along with that one laying off. Studding and joist are all 16 inches apart all over the building and ready to receive the lath.

There is no time spent at all for laying off the second floor except for laying out for the openings.

I am sure enough could be said on the subject to fill several pages, and I am in hopes this article will be the means of bringing out many good things.

Cement Products for Profit

THE above is a title of a booklet sent out by the Miracle Pressed Stone Co. of Minneapolis, Minn., and contains a lot of useful and instructive information. The subject is taken up in a systematic and thorough manner and it has been thought advisable to quote such parts of it as would be of special interest to our readers.

The first move of the prospective manufacturer is to provide suitable curing sheds. For operating one outfit at least 2,000 square feet is necessary. By having water piped to convenient points and using a hose, the sprinkling process is reduced to a few minutes' work. With 2,000 square feet floor space, blocks must be removed to the yard on the third day after making. Blocks of this age may be piled three or four high if care is taken in handling. They should be covered with tarpaulins, hay or with lumber.

How Concrete is Made

The ideal mixture of concrete is that in which all the voids in the aggregates or coarser materials are filled with sand, the voids in the sand having been filled with cement. Ordinary bank sand containing small quantities of clay, and in the moist state in which it is procured may be compacted considerably by tamping. A 1-3 dry mixture if used for blocks can be tamped so as to reduce the volume from 20 to 30 per cent of the loose mixture, that is to say, that one cubic foot of the loose mixture would make from .7 to .8 cubic feet tamped concrete.

In the selection of cement all that can be said here is to use any standard brand of Portland cement, which passes the tests recommended by American Society for Testing Materials. Hard lumps or caked portions of cement should be screened out and thrown away. They should never be mashed up and used for blocks. Good sand is very essential, and must be clean and especially free from loam. Small quantities of clay do not seem to damage it appreciably, that is to say, up to 5 per cent. It should be screened at least through a one-quarter inch mesh for making nice face blocks, but for foundation or rough work, one-half or three-quarter inch mesh may be used. Crushed granite with the dust removed makes a very excellent stone.

Mixing

Having selected the proper materials, the mixing is the next important step. Mixing by hand, not more than enough material for six or eight blocks should be made up at a time. The materials should be thoroughly turned at least three times dry or more if sand or cement streaks show. When thoroughly mixed the whole is of uniform color. Water is then applied preferably with a hand sprinkler, and the mixture is again turned until uniformly moistened. As to the amount of moisture, will state that the mixture should be of such consistency that when squeezed in the hand, it will hold together well. Use as much water as you can without causing the face of the block to stick to mold.

Curing and Taking Care of Blocks

Blocks should be sprinkled as soon as set sufficiently that they will not wash. Sometimes they can be sprinkled very lightly with sprinkling can in four hours after making, while at other times it is better to wait twenty-four hours. As soon as they have set sufficiently, they should be watered by means of a hose with spray nozzle, and should have water from one to five times daily, according to weather until cured. They should not be allowed to dry out so as to show white during the first ten days. From an average of twenty-five reports from manufacturers of concrete blocks the following data was secured:

Average age of first wetting	17 hours
Average time continue sprinkling	10 days
Average time under shed	4 days

After blocks have been cured for some time it will be noticed that they absorb much less water. Upon the first two or three wettings water seems to soak in as long as it is applied, while after a week or two most of it runs off. They should be sprinkled in every case until thoroughly saturated.

Causes of Poor Blocks

Probably the most common cause for poor blocks is improper curing. If very cold they will disintegrate entirely when thawed out, while if slightly frozen the outside will scale off. This destructive action is probably due to two causes: First, the freezing takes away the water from the cement and stops setting; and the expansion due to freezing breaks up any bond formed by the partially set cement. Another cause of poor blocks is material. There is no excuse for using poor cement, as there are many brands of Portland cement now on the market which can be relied upon. Sand must be carefully selected. The main idea is to get sand that is clean and especially that is free from loam. Quick sand is absolutely worthless. A small amount of clay in sand, however, is allowable, but even an excess of this is injurious. If your sand is very dirty throw it on a fine screen and turn a hose on it, unless you can procure some better. Still another cause for poor product is poor workmanship. The mixing should be perfect and the blocks evenly and solidly tamped, special attention being given to the corners.

The tabulated report which we here show is from twenty-five plants who are manufacturing concrete blocks. It gives a complete report from the kind of plant and equipment used, the cost, method and mixture used in mixing, the number of men used in operating the plant, the number of blocks made per day by each man, the curing and laying up of blocks and miscellaneous remarks. Among the miscellaneous remarks such subjects as to coloring blocks, the effect of freezing upon fresh blocks, and the capital required for one outfit, are treated upon.

TABULATED REPORTS FROM TWENTY-FIVE AVERAGE PLANTS

REF. NUMBER	PLANT AND EQUIPMENT			MIXING			OPERATION			CURING				LAYING UP BLOCKS			MISCELLANEOUS			
	SHED ROOM	SPRINKLING APPARATUS	TRUCK SYSTEM	MIXTURE	METHOD	COST PER BLOCK	NUMBER MEN	BLOCKS MADE PER DAY PER MAN	TERMS PAYING LABOR	AGE FIRST WETTING	LEAVE UNDER SHED	CONTINUE SPRINKLING DAYS	MISC. REMARKS	DISPOSING OF PRODUCT	NUMBER LAID BY MASON & HELPER PER DAY	COST LAYING	COLORING BLOCKS	EFFECT OF FREEZING FRESH BLKS	CAPITAL REQUIRED ONE OUTFIT	MISC. REMARKS
1	350 SQ.FT. COVER BLOCKS WITH BOARDS	CITY WATER HOSE - SPRAY	NONE	1-4	HAND	NOT PILING OR WETTING, MIXING AND TAMPING 3¢ TO 4¢	3	50	PIECE WORK	AS SOON AS SET ENOUGH TO NOT WASH	— DAYS	7	—	SELL TO CONSUMER CONTRACTORS DON'T FAVOR	—	—	—	CAUSES DISINTEGRATION - RUINS	VARIES SHOULD CARRY STOCK	—
2	480 SQ. FT.	FORCE PUMP AND HOSE	NONE	1-4 AND 1-5	MACHINE	COST BLOCK COMPLETE 12¢	3	—	DAY WORK	AS SOON AS THEY WILL STAND SPRAY	5	5	—	BEST TO CONTRACT FOR LAYING	100	—	RESULTS NOT GOOD	AFTER 5 DA. OLD BLOCKS WERE NOT INJURED	—	—
3	34'X60' 2040 SQ.FT.	HOSE CITY WATER	2 WHEEL TRUCKS & WHEEL BARROW	1-4	MACHINE	ALL LABOR MAKING AND PILING 5¢ BLOCK	2	40	DAY WORK	12 TO 18 HRS.	3	10	PUT STRIPS OF LATH BETWEEN LAYERS IN YARD	SELL TO CONSUMER OR CONTRACTOR	100 TO 150	5¢ PER BLOCK	—	—	$2000 TO $3000 SHOULD CARRY GOOD STOCK	SAND SHOULD BE SCREENED THROUGH 1/2" OR 3/8" MESH
4	35'X175' 6125 SQ.FT.	WATER PIPE THROUGH BLK HOSE CON. 100 FT APART	7' CARS ONE RACK 14 BLOCKS	1-3½	MACHINE	MIXING ONLY 100¢	11	60	DAY WORK	10 HRS.	5	5	SUBMERGING BLOCKS POOR PLAN	—	GROUND 150 SCAFFOLD 100	—	—	BAD ON FRESH BLKS	—	—
5	16'X200' 3200 SQ.FT.	HOSE	WHEELBARROW AND LOW TRUCK	1-4½	HAND	TOTAL LABOR 7-8¢ BLK.	3	33 TO 34	DAY WORK	10 TO 24 HRS.	2 TO 3	7	SPRINKLE 3 TIMES DAILY MORE WHEN VERY DRY	SELL TO CONSUMER	—	—	—	CHECKS MAKES BRITTLE	—	—
6	20'X80' 1600 SQ.FT. NOT ENOUGH	SPRINKLING CAN	SMALL GRAIN TRUCK SPECIAL FOOT TO GO UNDER PALLET	1-4½	HAND	—	3	30	DAY WORK	AS SOON AS WATER WILL NOT DAMAGE	2	10	PILE 5 BLOCKS HIGH IN YARD BREAK JOINTS COVER	SELL BLOCKS	—	5 TO 7¢ PER BLK	—	CORNERS CRUMBLE	$2000	—
7	—	PUMP AND HOSE	—	1-4 1-5	HAND	TOTAL LABOR 5 TO 6¢ BLOCK	4	35 TO 45	PIECE WORK	WHEN EDGES SHOW WHITE	2 TO 3	7	PILE ON GROUND NO LATH OR STRINGERS	SELL BLOCKS	—	—	—	—	—	—
8	14'X24' 336 SQ.FT.	CITY WATER, HOSE	—	1-3 SCREENED	HAND	—	3	30 TO 40	DAY WORK	18 TO 24 HRS.	3 TO 4	28 TO 35 BLOCKED IN SAND	—	—	—	—	—	—	—	—
9	40'X40' 1600 SQ.FT.	SPRINKLING CAN	—	1-4	HAND	1½¢ BLK. MIXING ONLY	4	40	DAY WORK	6 HOURS	6	4	—	SELL TO CONTRACTOR OR CONSUMER	—	—	—	—	—	—
10	30X40 1200 SQ.FT.	SPRINKLING CAN AND HOSE	—	1-1 1-4 1-5	HAND	2¢ BLK MIXING ONLY	3	50 PER BLK	PIECE WORK 6¢ BLK	12 HOURS	4	6	—	ARE CONT'RS DO OWN WORK	AVERAGE 2 STORY 90 IN 8 HRS	7½ TO 9¢ 9" BLK	—	SCALE OFF 1" ALL OVER	$1000	ONE MAN TAMPING TURNS OUT ALMOST AS MANY AS TWO
11	1200 SQ.FT.	CITY WATER	LIGHT CHEAP TRUCKS	1-4	HAND	ALL LABOR 5¢ BLK	6	66 TO 68	DAY WORK	24 HRS. OR WHEN DRY OUT SIDE	1½	5 OR MORE	BLOCKS 36 TO 48 HRS. OLD MORE WATER THE BETTER	LAY OWN BLOCKS	GROUND 125 1ST 100 2ND 75	7¢ BLK	GOOD RESULTS PREFER PLAIN	AFTER 36 HOURS NO EFFECT	VARIES $500 UP	BY WATERING PROPERLY BLKS WILL BECOME HARD AS FLINT
12	1500 SQ.FT. ALSO USE RACKS	WINDMILL, TANK, AND HOSE	WHEELBARROW, SPECIAL PLATFORM HOLD 2 TO 4 BLK	1-4 1-3½ CAPS 2½	HAND	ALL LABOR 5½ - 9" 7¢ - 12"	3 1 BOY	40 NOT COUNTING BOY	DAY WORK	SOON AS POSSIBLE	3 TO 4	8	COVER WITH BURLAP	SOME LET TURN SPRAY AT CORNERS UNTIL 7 OR 8 DAYS OLD - KEEP COVERED	BETTER TO LAY OWN BLOCKS	75 TO 200 AV. 125 9" BLK	6¢ CU.FT.	GOOD RESULTS EXCEPT EFFLORESCENCE	IF FROSTED BECOME HARD WHEN OLD WILL SCALE	$1500 OPERATING CAPITAL	—
13	30X40 DRYING 14X20 WORK 14X16 SAND	HOSE SPRINKLER	2 WHEEL SPRING TRUCKS	1-4	HAND	3¢ BLK.	4	40 TO 50	DAY WORK	24 HOURS	10	7 TO 8	—	BETTER TO LAY OWN BLOCKS	9" 150 12" 125	6¢ CU.FT.	GOOD RESULTS WITH MINERAL RED	RUINS BLOCK IF STILL WET, IF EVENLY DRIED - NOT	$1000 TO 1500	—
14	30X10 2100 SMOULD HAVE 50 X 100	ELEVATED TANK AND HOSE	—	1-4	HAND	6¢ AND 7¢ BLOCKS PILED IN YARD	3 1 BOY	50 NOT COUNTING BOY	PIECE WORK	4 TO 8 HOURS DEPENDS ON WEATHER	3	4 TO 6 LONGER IN DRY WEATHER	PILE WITH LATH BETWEEN PROTECT FROM DRY WIND	LAYS OWN BLOCKS AND GUARANTEES WORK	80 TO 100	5¢ AV.	—	LITTLE FREEZING MAKES BLKS CRUMBLE	$1000 TO 2000	BLOCKS SHOULD NOT BE SOLD BEFORE TWO MONTHS OLD
15	30X60' 1800 SQ.FT.	FORCE PUMP HOSE AND SPRINKLER	—	1-4	MACHINE	2¢ BLK, MIXING ONLY	3	33	DAY WORK	AS SOON AS THEY WONT WASH	4 OR MORE	4 OR MORE	SPRINKLE OFTEN ENOUGH THAT EDGES WILL NOT GET DRY	—	—	—	GOOD RESULTS & MICHLEBRONZE MORTAR COLOR TO EACH CAMER	—	$2000	—
16	TRACK ROOM FOR 10 CARS IN BLDG.	CITY WATER HOSE	CARS OF MIRACLE PATTERN	1000 1-6 2000 1-5 BLK 1-4	MACHINE 1000 CLOTH BASKETS	20¢ CU.YD. ABOUT 7¢ 12" BLK	INCLUDES BOY LOADS 6 DRY WAGONS	47 12" BLKS	DAY WORK BEST	SPRAY AT 4 HRS WHEN TEMP. IS ABOVE 50°	ON CARS 10 HR IN BUILDING	ON PALLETS 36 HRS. MORE COVERED WITH HAY VERY WET	STACK IN YARD 6 HIGH COVER WITH HAY KEEP VERY WET.	SELL OR CONTRACT	120 AT ALL STAGES USE OVERHEAD TRACK OVERALL	7¢ EACH	—	DESTRUCTIVE UNDER 7 OR 8 DAYS	$1000 OPERATING CAP. WILL SUFFICE	WORKS 2 MEN TO EACH MOLD 2 FOR MIXER AND LOADING TEAM
17	1300 SQ. FT.	CITY WATER HOSE		WILL 1-5 CHANGE TO 1-4	HAND	TOTAL LABOR 4 TO 4½¢	3	45 TO 46	DAY WORK BEST	48 HRS.	2	5	USE PLENTY OF WATER FIRST TWO DAYS	—	—	—	—	—	$1000	—
18	40X80 3200 SQ.FT.	HOSE	CARS	1-3 TO 1-5	HAND	TOTAL LABOR 5¢	5	50	DAY WORK	12 HOURS	7	7 TO 10	—	MOSTLY OWN CONTRACTS	100	3½¢ CU.FT.	—	CAUSES CRUMBLING	1000 OPERATING	—
19	40X100 4000 SQ.FT.	HOSE	—	1-3½	HAND	TOTAL COST 9" BLOCK 16¢	2	WATER AND CARRY OUT 50	DAY WORK	SOON AS WILL NOT WASH	2 TO 2½	AS LONG AS IN YARD	CONTINUED WETTING MAKES HARDER BLOCKS	PREFER DOING OWN WORK BETTER RESULTS	150	8¢ BLK	—	OUT SIDE CRUMBLES FAR AS FRESH	$2000	—
20	2240 SQ.FT	HOSE	HOME MADE TRUCKS HOLDS 10 STD. BLKS	1-5	HAND	MIXING ONLY 1 TO 1½¢ BLK	3	40 TO 50	DAY WORK	SOON AS CAN SAFELY	3	7	CONTINUE LONGER IF NECESSARY	SELL OR CONTRACT PREFER SELL	MASONS PREJUDICED	—	—	OUT SIDE SCALES OFF	$1500	AGREAT DEAL DEPENDS ON GOOD WORK
21	2000 SQ.FT	HOSE WITH SPRAY	USE TRUCK OF MIRACLE PATTERN	1-5	HAND	4 TO 5¢ FOR ALL LABOR	3	40 TO 50	DAY WORK	SOON AS SNOW WHITE 8 TO 24 HR.	10	10	SPRINKLE BY HAND GENTLY FIRST PLENTY WATER AFTER	—	—	—	IRON OXIDE RED OCHRE — BUFF GERMAN LAMP BLACK GRAY	RUINS ENTIRELY	$1500	—
22	4000 SQ.FT.	CITY WATER HOSE	—	1-3 1-4 1-5	HAND	—	6	—	DAY WORK	USUALLY 48 HR YARILS	TO 2 3	10	—	MASONS TAKE CONT.	—	—	—	BLISTERS AND DISINTEGRATE	$5000	—
23	40X76 3040 SQ.FT	FORCE PUMP AND HOSE	—	BLK 1-5 TILE 1-3	HAND	—	3	—	DAY WORK	12 TO 16 HOURS	7	21 TO 28	—	—	—	—	—	—	—	—
24	33X33 989 SQ.FT.	SPRINKLING CAN	—	1-4	HAND	2¢ MIXING ONLY 12" BLK.	5	50 TO 60	PIECE WORK BEST	24 HRS	2	6 TO 7	PILE WITH STRIPS BET.	—	—	—	—	—	—	—
25	24X60 1200 SQ.FT.	WINDMILL TANK HOSE	—	1-3 1-5	HAND	TOTAL LABOR 7¢	3	58 TO 66	PIECE WORK	DEPENDS ON WEATHER	3	DEMANDS ON WEATHER	COVER WITH SAND	LAYS OWN BLOCKS	300	2¢ CU.FT	GOOD RESULTS	RUINS BLOCKS	$1000	

NOTE:- ON ACCOUNT OF THE LARGE NUMBER OF REPORTS RECEIVED IT WAS IMPOSSIBLE TO TABULATE ALL, HENCE THE FIRST 25 WERE SELECTED AS BEING FAIRLY REPRESENTATIVE OF THE WHOLE. PARTS OF NOS. 23 AND 24 LOST OR MISLAID. NAMES CORRESPONDING TO REFERENCE NUMBER ON FILE AT OFFICE OF MIRACLE PRESSED STONE CO.

+COMPILED BY A.P. MELTON+

Edward Hurst Brown.

Painting the New House

MATERIALS AND PROCESSES NECESSARY TO GRAIN WOOD — BEAUTIFUL EFFECTS WHICH CAN BE PRODUCED — SKILLED WORKMEN ESSENTIAL TO PRODUCE GOOD RESULTS

A BRANCH of painting which has fallen into comparative disuse in certain sections of this country, although still largely used in Boston, Philadelphia and some other eastern cities, as well as in San Francisco, and considerably used in England, is graining or the imitation of more expensive woods by means of a peculiar process of painting. John Ruskin, the celebrated art critic, condemned graining as a sham, and looked upon the painstaking imitation of the grains and growth of wood as one of the meanest occupations a man could engage in. Yet John Ruskin condemned all veneering likewise, because it was a sham. Now every intelligent builder knows that from the standpoint of practical utility a veneered door is preferable to a solid door, because it is less liable to twist, split or warp. So, too, graining has much to commend it from the merely utilitarian standpoint. A well-grained door will stand exposure to the weather several times as long as a hardwood door, and can be renewed for about the same expense as it will cost to properly clean off and refinish a weather-beaten oak, walnut or mahogany door. For interior woodwork, graining will outlast plain painting many times over; it does not show dirt so readily and is much easier kept clean. It will last longer, too, than hardwood or even than yellow pine finish. Where two rooms are finished in different woods, a white pine door connecting the two rooms may be grained to correspond with the woodwork in each room, without the danger from twisting so often found when veneers of different woods are used. If skillfully done, it is practically impossible to tell the grained wood from that which it is intended to imitate. The writer has seen sample panels of graining exhibited at paint trade conventions which were so perfectly done that it was difficult to convince expert wood finishers that they were not genuine samples of oak, walnut and mahogany. When an old building is altered, it is frequently necessary to bring the old painted woodwork into harmony with the new hardwood, and this can readily be accomplished by the grainer.

Now why should graining be condemned? Surely not because it is an imitation. If honesty in art demands that all things must be exactly what they seem and that the materials used in construction must be left exactly as they are, we would have to abandon paint itself, for paint coats the wooden structure with a thin film of color which hides the wood and changes its appearance. Wall paper imitates tapestry hangings and fabrics of all kinds. Galvanized iron imitates solid stone. So does cement construction. Plaster is only an imitation of stone and stucco and other ornaments are at best imitations. If we are to give up every material or every method in building which is an imitation of something else, we must get back to the log cabin or the mud hut. Pictures are but imitations, and why it should be any less genuine art to beautify the woodwork of a house by graining it in skillful imitation of the beauty of some rare and costly wood, taking nature's handiwork as our model, than to portray nature upon canvas or paper, is difficult to see.

Commercial Graining

There is a class of graining much used in Philadelphia that is generally referred to as commercial graining, because it is done more cheaply and with less care and accuracy in the matter of imitation than the better work. A glance shows the expert that it is graining and not the natural oak or walnut—for these two woods are the only ones imitated in this cheaper work. This commercial graining is very largely employed in finishing the kitchens of the small houses that are put up for sale by speculative builders, the purchasers usually being mechanics. These grained kitchens will stand hard service and resist the steam, dampness and the rough knocks incidental to a kitchen much better than genuine oak or walnut. Moreover, it is easy to keep grained work clean by simply wiping it down with a damp cloth.

Before the trades became as specialized as they are now, nearly every good painter knew something of graining, but nowadays, when it is difficult to get good all-round mechanics, and when many men jump into the ranks of journeymen painters who have never served an apprenticeship, but who have learned all they know of painting from spreading mixed paint on steamboats, railroad bridges and rough work gen-

erally, the journeyman painter who knows anything about graining is very hard to find. The work is generally confined to men who make a specialty of graining and are known as "grainers to the trade." These grainers sometimes depend on the ordinary painters to do the preliminary work, or prepare the "grounds," as the under coats for graining are called, but as this requires special knowledge, not only of the colors, but in order to build up the surface properly, many grainers to the trade hire their own journeymen to ground the work for them, and to assist them in rubbing in, doing only the finer and more artistic parts of the work with their own hands. The graining is usually done as a sub-contract under the painting work.

One of the best-known grainers of this country is William E. Wall of Somerville, Mass., the secretary of the International Association of Master House Painters and Decorators of the United States and Canada. Mr. Wall won the first prize, a bronze medal, at the World's Columbian Exposition in Chicago, 1893; the first prize, a silver medal, at the Louisiana Purchase Exposition in St. Louis, in 1904; and the first prize, a gold medal, at the Lewis & Clark Centennial Exposition, Portland, Ore., in 1905. Among the examples of graining exhibited by him was a table top, grained to represent inlaid work, showing fourteen varieties of wood and apparently composed of 12,426 pieces. The writer has examined this work very carefully and it is impossible to detect the fact that this is imitation and not the genuine wood inlaid, showing the perfection to which the art of graining has been carried. Mr. Wall has also written several books on graining, which have become recognized text-books for those desiring to learn the art.

Although graining is too difficult to be undertaken except by the specialist, its principles should be understood by the painter and builder, and they will here be briefly outlined.

Several operations are necessary to produce a piece of graining, and these operations require in all from four to seven or eight coats of paint or varnish. First the work is grounded; then the work is grained either in oil or water color and lastly the work is shellacked or varnished. It will be seen therefore that there is good reason for the fact that a good job of graining is more durable than the ordinary painted or varnished work, which seldom has more than four coats.

Preparing the Ground

The first thing to be done to insure a good job of graining is to get the surface of the wood as smooth as possible. Any surface roughnesses or inequalities will mar the finished work just as surely as they would in furniture finishing or piano polishing. So if the carpenter has not thoroughly sandpapered or cleaned up the work, the first duty of the painter is to get at it with sandpaper or steel wool and make the surface smooth. If the graining is to be done over old painted work, the paint must first be removed, if it is scaly or uneven, either with a paint remover or by means of a paint burner, or if the old paint is in good condition it may be cut down with steel wool or sandpaper until the smooth, even surface, without gloss, is left.

If the graining is to be done on new wood, and there is any danger of the presence of sap in the wood, it should be given a coat of shellac before the first coat of ground color. Indeed, this is always a useful expedient. All knots, of course, must be killed by coating them with shellac.

Where the wood to be imitated is light in color, such as maple, oak or satinwood, and the work is to be done on new wood, either on clear white pine, whitewood or spruce, that is free from knots, the graining is sometimes done on a ground formed by giving the surface two thin coats of shellac. In some cases, even, a coat of white glue size is used, although this has the objection of raising the grain of the wood, and it can be used only when the graining is to be done in oil colors as water or distemper colors would soften up the glue size, causing it to mix with the graining color and giving no proper foundation for the work. These methods of graining on a transparent ground are, however, suited only for certain cheap classes of work, particularly for furniture, and are neither so close an imitation of the wood nor so durable as when the work is done with an oil and pigment ground color.

To prepare the ground for graining the finest ground pure white lead and colors ground in pure linseed oil must be used. The appearance of the finished work will depend largely upon the care and trouble taken to have the ground just right. For ordinary work two coats of ground color are applied, but far better results will be obtained by using three thin coats. For the first coat, on new work, only a small proportion of turpentine is to be used in the thinners. The second and third coats are thinned with one part of linseed oil to three parts of turpentine. A little good varnish added to the thinners helps to harden the ground and leave it in better condition for graining. The graining color should always be strained through fine muslin or cheesecloth before using and the work must be lightly sandpapered and thoroughly dusted off between coats. Some grainers advocate the use of one part of red lead to three parts of white lead in the priming coat, as this dries harder than pure white lead.

One of the most important things to be considered in preparing the ground is the color. Grainers, as a rule, are conservative, and often follow certain formulas for producing the proper ground color, because the master from whom they learned the trade had mixed his color that way. The progressive grainer who regards the artistic possibilities of his work, knows that the only safe guide is nature. The ground color, therefore, should be the lightest color found

in the natural wood that is to be imitated, after the latter has been finished and varnished. The first and second ground coats should be a little darker than the final one, as it is a well-known fact that a light coat of paint will appear more even in color tone when applied over a coat of paint of a slightly darker shade. Where grained work is to be done to match natural woodwork, used in connection with it, it must not be forgotten that all wood gradually darkens in tone, and if the grained work is made exactly the same color as the natural wood—although it may be a perfect match when completed—it will, before many months, appear considerably lighter. It is therefore best always to make the graining ground one or two shades darker than the lightest color of the woodwork to be matched.

Some manufacturers make prepared graining grounds, in paste form, of white lead tinted to the shade supposed to be the proper one for the wood indicated by the label. These prepared grounds are satisfactory enough for ordinary commercial graining and are useful where the painter who prepares the ground is unable to mix the proper color. One thing must always be borne in mind—that it is impossible for the grainer to do a good job on a ground work whose color is not adapted to produce a correct imitation of the wood. Unfortunately many painters prepare the ground themselves, paying little or no attention to obtaining the proper shade, and then blame the grainer because his work is not a satisfactory imitation of the wood. Where high-class graining is to be done, it is best to have the grainer give the last ground coat, at least.

Many of the washable distemper colors are advertised by their manufacturers as suitable for graining grounds, but as they often contain alkalies, which act on the subsequent coats of oil color and varnish, their use cannot be recommended. Moreover they possess another disadvantage, in common with a priming of glue size, that if moisture attacks the work from behind, the paint will lose its hold and peel off from the wood, carrying all the subsequent coats with it.

The Process of Graining

The colors used in graining are all transparent or semi-transparent in their nature, such as raw and burnt sienna, raw and burnt umber and Vandyke brown, and must be carefully selected and ground very fine.

In graining with oil colors, the thinner is different from that used in ordinary painting, pure beeswax dissolved in turpentine being added to the linseed oil, turpentine and driers used for ordinary oil painting. The beeswax is used to give a certain stiffness to the color and prevent it from running together in the subsequent operations. For certain woods where greater stiffness of the color is required, the addition of about an ounce of megilp to the gallon of oil color is required. This is a preparation which is used to increase the density of the color without affecting its shade.

In water color graining the thinners may be either clear water if the color is ground in a binding medium, such as glue, or one-third to one-half of stale beer mixed with clear water. In place of beer, one-third vinegar with a little sugar is used, or some grainers use skimmed milk as a thinner.

Besides brushes of several varieties, grainers use rubber, leather, cork or steel combs, the selvedge edge of a piece of straw matting, a rag, a sponge and a check roller formed of a series of zinc disks. But in addition to these one of the most useful and effective tools employed by the grainer, especially in imitating quartered oak and other woods showing large light spaces, is the end of the thumb. For the imitation of certain kinds of wood, specially prepared crayons are employed, but the work done with these is apt to look crude and harsh unless skillfully blended.

The first operation in graining is termed "rubbing in," and consists in covering the wood evenly with a coat of the proper color. This must be done very skillfully as unless it is properly done, the grainer is handicapped in all his subsequent operations. It requires years of practice to "rub in" properly, and this part of the work should not be entrusted to the ordinary journeyman painter, but should be left to the grainer's assistant.

After the graining color has been rubbed in, the next operation, in those portions of the work that are to be left with plain grains, or are to be the background for oak quarterings, is the "combing out," which consists in removing the color in stripes, more or less regular, according to the figure of the work to be imitated, by means of the teeth of a comb, which pushes the color to one side. In some cases, the teeth of the comb are covered with a rag. In natural wood the dark lines are the pores or open portions of the grain, and the grainers must exercise great care to prevent his work from having a ridgy appearance. The next thing to do in graining oak is wiping out the heart grains by means of a rag wrapped round the thumb nail. The quarterings are wiped out with a rag wrapped round the end of the thumb. It will be evident, therefore, why the proper color of the ground was so important, because the ground color is seen through the graining. Some grainers use a rubber roller marked with indentations formed somewhat like the heart growths of oak. By drawing this down over the panel, revolving it in the hands as it is pulled downward, the grain of oak is imitated very rapidly. Variations are made by turning the roller quickly or more slowly, the latter producing figures of much greater length. While these rubber rollers are very useful for the cheaper class of commercial graining, work done with them has considerable sameness and can hardly be called the highest class.

After the work is dry, any first-class job of graining must be "overgrained," which produces the fine darker lines of the grain that show in the high lights. This is done by means of a wide, flat camel's hair brush, which is divided into a series of narrow pencils by means of a comb held in the left hand. Skillful overgraining produces a very close imitation of the natural wood, but in cheaper work it is often omitted.

For softening the harsh edges produced by combing and wiping out the grains, special brushes called blenders are used; and for other purposes mottlers are employed.

The processes just outlined indicate in a general way the method employed in the imitation of oak, the general principles being the same for all woods, varied of course in such manner as may be needed to produce the peculiar markings characteristic of the wood to be imitated. The grainer who has any real love for his art will make a study of the finest panels of natural wood that he can find and will constantly improve in his work, for graining is one of those trades—perhaps the word "art" should be used rather than trade—in which it is impossible for a man ever to know it all. Much of the beauty of grained work depends upon the skill with which the grainer adapts the pattern to the location and by selecting the proper design of pattern or form of growth to be imitated, will greatly enhance the attractiveness of the door or other woodwork that has been grained. In this way the grainer may produce effects impossible to obtain in natural woodwork unless each particular piece of lumber has been carefully selected. Even then, the grain is not fully developed until the woodwork is entirely finished, while the grainer has perfect control over the markings.

For cheaper grades of graining, there are a number of mechanical methods by which the ordinary journeyman painter may in a measure produce some of the effects of the grainer. One of these is graining transfer paper, consisting of a porous paper upon which the dark color of the oak or other wood is printed in a special transfer ink. This paper is applied to the already grounded surface, and by dampening it on the back and rolling it or pressing it, allowing it to remain upon the surface for several minutes the pattern is transferred. The effect is rather crude and harsh and is only suitable for cheap work or where it is impossible to obtain the services of a skilled grainer. A stencil is also made which can be used with much more success by the professional grainer than by the amateur. There is also a graining pad machine and a means of transferring the grain of the natural wood by a roller made of a composition similar to that of printers' rollers. These latter mechanical devices are better adapted for use in furniture factories or by agricultural implement makers or box factories than for the woodwork of buildings, because the pattern constantly repeats itself. On a small surface this, of course, is not seen. The work produced by these devices is of such a mechanical nature as to lack all the artistic merits of real graining.

After the graining has been completed it must be protected by two or more coats of varnish, which can be rubbed, if desired, the same as in ordinary hardwood finishing.

Graining is not limited to woodwork, but plastered walls and ceilings may be grained to imitate wood panelling or graining may be done upon metal or upon glass. It is sometimes done upon the reverse side of glass, so that the graining is seen through the glass. In this case the processes are necessarily reversed; the overgraining is first applied, then the graining color, and last of all the opaque ground color, which backs up all the rest and brings out the effect of the transparent color already applied.

Marbling

Closely akin to graining is marbling, by which the effect of costly marbles is obtained on wood or plaster. Very little of this work is done in this country, where the abundant deposits of beautifully colored marbles have made the use of the real stone comparatively inexpensive, but in European countries, where the guides in showing one over a palace or a cathedral will point with special pride to certain portions of the building and say, "This is real marble," the art of imitating marbles has been carried to great perfection and often the only method of detecting the imitation is by laying one's hand upon the surface and finding the absence of the sensation of coolness inseparable from the stone.

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A Theater of Novel Design

A theater and music hall of rather a novel design is at present being considered as an addition in the near future to the already extensive number of places of amusement in New York City. We understand that a site has been secured in Forty-second street, extending through to Forty-third street, just west of Sixth avenue, and the structure will be put up on lines similar to the music halls of Europe. The main entrance will be from Forty-second street, with an elaborate lobby extending through to the carriage entrance on Forty-third street. One of the novel features of the theater will be the seats, which will provide patrons arm chairs arranged in rows sufficiently far apart to admit of each seat holder taking his place without disturbing those already seated; commodious anterooms on each floor, a spacious restaurant, a magnificent dress promenade and an extensive roof garden. These are features which cannot fail to be appreciated.

in the natural wood that is to be imitated, after the latter has been finished and varnished. The first and second ground coats should be a little darker than the final one, as it is a well-known fact that a light coat of paint will appear more even in color tone when applied over a coat of paint of a slightly darker shade. Where grained work is to be done to match natural woodwork, used in connection with it, it must not be forgotten that all wood gradually darkens in tone, and if the grained work is made exactly the same color as the natural wood—although it may be a perfect match when completed—it will, before many months, appear considerably lighter. It is therefore best always to make the graining ground one or two shades darker than the lightest color of the woodwork to be matched.

Some manufacturers make prepared graining grounds, in paste form, of white lead tinted to the shade supposed to be the proper one for the wood indicated by the label. These prepared grounds are satisfactory enough for ordinary commercial graining and are useful where the painter who prepares the ground is unable to mix the proper color. One thing must always be borne in mind—that it is impossible for the grainer to do a good job on a ground work whose color is not adapted to produce a correct imitation of the wood. Unfortunately many painters prepare the ground themselves, paying little or no attention to obtaining the proper shade, and then blame the grainer because his work is not a satisfactory imitation of the wood. Where high-class graining is to be done, it is best to have the grainer give the last ground coat, at least.

Many of the washable distemper colors are advertised by their manufacturers as suitable for graining grounds, but as they often contain alkalies, which act on the subsequent coats of oil color and varnish, their use cannot be recommended. Moreover they possess another disadvantage, in common with a priming of glue size, that if moisture attacks the work from behind, the paint will lose its hold and peel off from the wood, carrying all the subsequent coats with it.

The Process of Graining

The colors used in graining are all transparent or semi-transparent in their nature, such as raw and burnt sienna, raw and burnt umber and Vandyke brown, and must be carefully selected and ground very fine.

In graining with oil colors, the thinner is different from that used in ordinary painting, pure beeswax dissolved in turpentine being added to the linseed oil, turpentine and driers used for ordinary oil painting. The beeswax is used to give a certain stiffness to the color and prevent it from running together in the subsequent operations. For certain woods where greater stiffness of the color is required, the addition of about an ounce of megilp to the gallon of oil color is required. This is a preparation which is used to increase the density of the color without affecting its shade.

In water color graining the thinners may be either clear water if the color is ground in a binding medium, such as glue, or one-third to one-half of stale beer mixed with clear water. In place of beer, one-third vinegar with a little sugar is used, or some grainers use skimmed milk as a thinner.

Besides brushes of several varieties, grainers use rubber, leather, cork or steel combs, the selvedge edge of a piece of straw matting, a rag, a sponge and a check roller formed of a series of zinc disks. But in addition to these one of the most useful and effective tools employed by the grainer, especially in imitating quartered oak and other woods showing large light spaces, is the end of the thumb. For the imitation of certain kinds of wood, specially prepared crayons are employed, but the work done with these is apt to look crude and harsh unless skillfully blended.

The first operation in graining is termed "rubbing in," and consists in covering the wood evenly with a coat of the proper color. This must be done very skillfully as unless it is properly done, the grainer is handicapped in all his subsequent operations. It requires years of practice to "rub in" properly, and this part of the work should not be entrusted to the ordinary journeyman painter, but should be left to the grainer's assistant.

After the graining color has been rubbed in, the next operation, in those portions of the work that are to be left with plain grains, or are to be the background for oak quarterings, is the "combing out," which consists in removing the color in stripes, more or less regular, according to the figure of the work to be imitated, by means of the teeth of a comb, which pushes the color to one side. In some cases, the teeth of the comb are covered with a rag. In natural wood the dark lines are the pores or open portions of the grain, and the grainers must exercise great care to prevent his work from having a ridgy appearance. The next thing to do in graining oak is wiping out the heart grains by means of a rag wrapped round the thumb nail. The quarterings are wiped out with a rag wrapped round the end of the thumb. It will be evident, therefore, why the proper color of the ground was so important, because the ground color is seen through the graining. Some grainers use a rubber roller marked with indentations formed somewhat like the heart growths of oak. By drawing this down over the panel, revolving it in the hands as it is pulled downward, the grain of oak is imitated very rapidly. Variations are made by turning the roller quickly or more slowly, the latter producing figures of much greater length. While these rubber rollers are very useful for the cheaper class of commercial graining, work done with them has considerable sameness and can hardly be called the highest class.

After the work is dry, any first-class job of graining must be "overgrained," which produces the fine darker lines of the grain that show in the high lights. This is done by means of a wide, flat camel's hair brush, which is divided into a series of narrow pencils by means of a comb held in the left hand. Skillful overgraining produces a very close imitation of the natural wood, but in cheaper work it is often omitted.

For softening the harsh edges produced by combing and wiping out the grains, special brushes called blenders are used; and for other purposes mottlers are employed.

The processes just outlined indicate in a general way the method employed in the imitation of oak, the general principles being the same for all woods, varied of course in such manner as may be needed to produce the peculiar markings characteristic of the wood to be imitated. The grainer who has any real love for his art will make a study of the finest panels of natural wood that he can find and will constantly improve in his work, for graining is one of those trades—perhaps the word "art" should be used rather than trade—in which it is impossible for a man ever to know it all. Much of the beauty of grained work depends upon the skill with which the grainer adapts the pattern to the location and by selecting the proper design of pattern or form of growth to be imitated, will greatly enhance the attractiveness of the door or other woodwork that has been grained. In this way the grainer may produce effects impossible to obtain in natural woodwork unless each particular piece of lumber has been carefully selected. Even then, the grain is not fully developed until the woodwork is entirely finished, while the grainer has perfect control over the markings.

For cheaper grades of graining, there are a number of mechanical methods by which the ordinary journeyman painter may in a measure produce some of the effects of the grainer. One of these is graining transfer paper, consisting of a porous paper upon which the dark color of the oak or other wood is printed in a special transfer ink. This paper is applied to the already grounded surface, and by dampening it on the back and rolling it or pressing it, allowing it to remain upon the surface for several minutes the pattern is transferred. The effect is rather crude and harsh and is only suitable for cheap work or where it is impossible to obtain the services of a skilled grainer. A stencil is also made which can be used with much more success by the professional grainer than by the amateur. There is also a graining pad machine and a means of transferring the grain of the natural wood by a roller made of a composition similar to that of printers' rollers. These latter mechanical devices are better adapted for use in furniture factories or by agricultural implement makers or box factories than for the woodwork of buildings, because the pattern constantly repeats itself. On a small surface this, of course, is not seen. The work produced by these devices is of such a mechanical nature as to lack all the artistic merits of real graining.

After the graining has been completed it must be protected by two or more coats of varnish, which can be rubbed, if desired, the same as in ordinary hardwood finishing.

Graining is not limited to woodwork, but plastered walls and ceilings may be grained to imitate wood panelling or graining may be done upon metal or upon glass. It is sometimes done upon the reverse side of glass, so that the graining is seen through the glass. In this case the processes are necessarily reversed; the overgraining is first applied, then the graining color, and last of all the opaque ground color, which backs up all the rest and brings out the effect of the transparent color already applied.

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Something the Boys Can Make

TELLING HOW TO MAKE AN UMBRELLA STAND — PROPER METHOD OF PREPARING WOOD TO GET THE BEST RESULTS — CARE TO BE TAKEN TO GET ALL PARTS EXACT

IN THE July, 1905, number of the AMERICAN CARPENTER AND BUILDER, there appeared in this department a description of the manner of making a hall-tree. The umbrella stand, Fig. 1, makes a good companion piece for this.

It is of simple design, comparatively easy to make

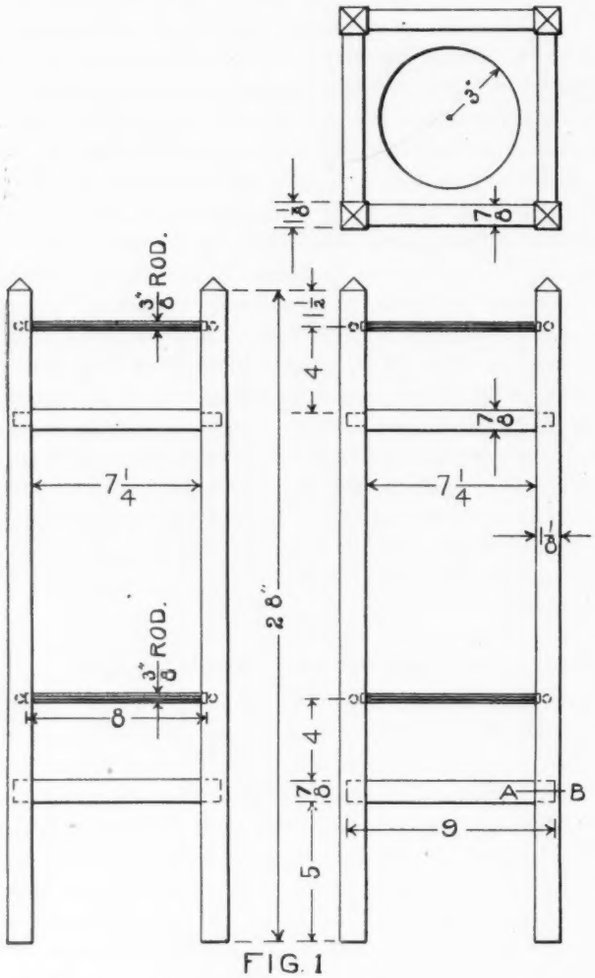


FIG. 1

and with the copper drip-pan provides a very satisfactory place for keeping umbrellas.

For the posts, square up in the usual way four pieces of stock so that they shall be when completed one and one-eighth inches square and of a length sufficient to make 28 inches not including the bevels at the top ends.

A good way, described in previous numbers, but which cannot be repeated too often, is to get a board dressed on two sides to a thickness of one and one-eighth inches. It will be slightly thicker than this, so that the smoothing plane can be set very shallow and the mill marks planed off without reducing the thickness below what is wanted if care is exercised. Next, joint one edge, making it straight, and square to the working face which has previously been selected and marked. Set the gauge to one and one-eighth inches and gauge, keeping the block against the edge just planed. Rip parallel to this gauge line, allowing a small margin for planing. Plane carefully to the gauge line, testing the edge with the trysquare frequently while planing to make sure it will be

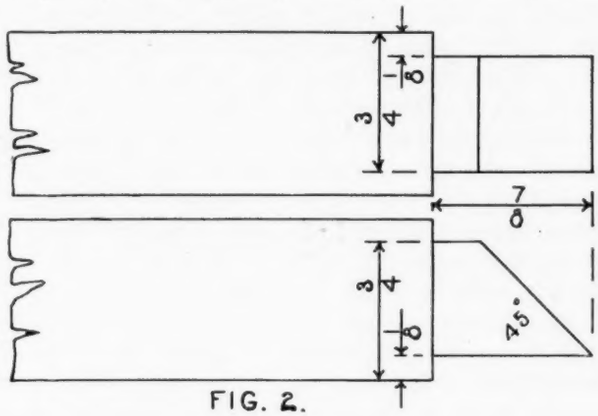


FIG. 2.

square when the line has been reached. This operation can be repeated until the four pieces have been obtained.

Square the end of each post, then measure off twenty-eight inches and slope the remaining end to an angle of forty-five degrees. The manner of setting the bevel square for this cut and the description of how to proceed with the work will be found in the July, 1905, number.

Rather than make a measurement of each of these lengths separately a better way would be to square up the four sides and one end of each; then, placing them side by side with the planed ends, made even and squared to the side of one of them by means of the trysquare, measure the length and square across the four at once.

Before finishing the posts, get out the stock for the remaining pieces.

Proceeding in the same manner as with the posts,

get out four rails for around the top of the stand. Use stock seven-eighths of an inch thick and make the pieces seven-eighths of an inch square. Cut them to a length of nine inches. As these ends are to have mitered tenons on them, Fig. 2, they need not be planed at all, but merely sawed to the line.

For the shelf which supports the drip-pan, square up a piece of seven-eighths inch stock so that its surfaces shall be free of mill marks and shall measure nine inches by nine inches by seven-eighths of an inch.

Secure a stick of dowel rod of three-eighths of an

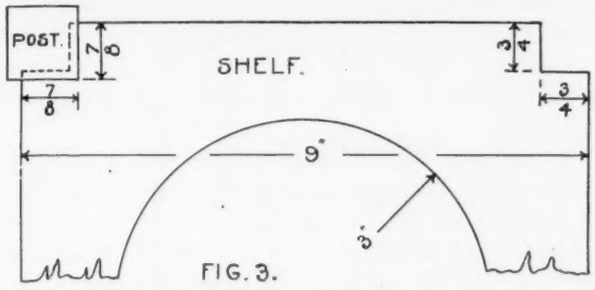


FIG. 3.

inch diameter, a slightly larger or smaller size would do, and cut it into eight lengths of eight inches each.

This prepares all the stock necessary. The shelf for the drip-pan (Fig. 3) may next be completed. With the trysquare and a sharp pointed pencil, square lines three-fourths of an inch, measured from the corner, in each direction. Prepare each of the corners in this way. Saw carefully to these lines, using the chisel to trim them true, if necessary. Draw the diagonals, or the lines which extend from corner to opposite corner, so as to locate the center of the board. Set the dividers to a distance of three inches between the points and describe a circle. It would be better to draw the diagonals before the corners of the board are cut to insure locating them properly.

Bore a hole within this circle of a size sufficient to

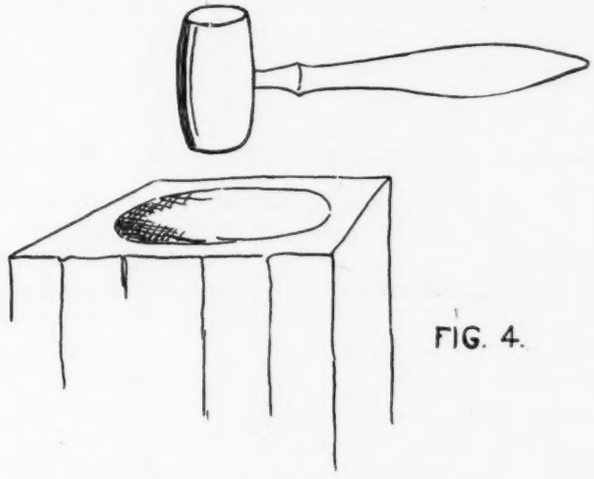


FIG. 4.

allow the blade of the turning saw to enter. In this case, what is known as a key-hole saw will be better. The turning saw can be used, however, by taking the saw blade loose at one end and inserting it through the hole, then fastening it again. Smooth the circle after sawing with rasp and scraper.

Since cutting such a large hole weakens the board quite materially, small cleats on the underside running across the grain may be fastened to good advantage.

Next, lay out the tenons which are to be made on the ends of the rails. Place the four rails side by side, getting the ends even and square to the sides. Measure from the evened ends seven-eighths of an inch, then seven and one-fourth inches from this line and square lines across the faces at these points. There should remain seven-eighths of an inch from

this line to the end of the piece. Square these lines entirely around each of the pieces, keeping the try-square handle against the working-face and joint-edge respectively while so doing.

Set the gauge at one-eighth of an inch, Fig. 2, and gauge each side of each piece at each end. Next set the gauge to three-quarters of an inch and gauge as before. Be sure to keep the gauge-block against the working-face and joint-edge.

With the tenon saw rip to these gauge lines and cross-cut to the pencil lines. Make sure the shoulders of the tenons are square before you proceed further.

A miter of forty-five degrees should be cut on the ends. This can best be done with the miterbox. The long point of the miter should be seven-eighths of an inch from the shoulder of the tenon.

Place the posts upright, in the positions they are to occupy relative to one another and mark in some way the approximate locations of the holes which receive the dowels, the mortises which receive the tenons, and the gains in which the drip-pan shelf enters its corners. Now, place them side by side with the inside surfaces upward and even, and square the lower ends to the sides. Measure from the bottom of the posts five inches; from this point seven-eighths of an inch; from this four inches; then twelve inches; five-eighths of an inch; and finally four inches. There should remain one and one-half inches to the edge of the bevel which is on the top. Square, sharp pencil lines across the four pieces at these points. Carry these lines across the remaining inner surface, using the trysquare.

Set the gauge to seven-eighths of an inch and, keeping the block against the inner surface gauge on the remaining inner surfaces between the lower marks, which are seven-eighths of an inch apart Do this on each inner surface of the four posts. Set the gauge to one-eighth of an inch and gauge as before. This gives the depth of the gain or recess, while the first setting of the gauge gave the width.

For the sides of the mortises at the upper ends of the posts, set the gauge first to one-quarter of an inch and gauge from the outside surfaces upon each of the inside surfaces, between the lines which were laid off five-eighths of an inch apart. Then set the gauge to seven-eighths of an inch and repeat, keeping the block against the same surfaces as before.

Measure and mark on the remaining lines the middle of the posts. These marks give the points at which to set the spur of the bit in boring the holes for the dowel rods.

Chisel the gains, as described in the July, 1905, number of this journal, and cut the mortises as described in the November, 1905, number.

Bore the holes for the dowels with a three-eighths inch bit. If possible, secure a bit one thirty-second of an inch smaller than the supposed size of the dowel. Dowels shrink and this will insure a tight fit.

Scrape with the steel scraper and sandpaper all the parts before putting them together.

Put a touch of glue on the ends of two of the dowel rods and on one of the tenons and drive them in place. Then glue the remaining ends and place the corresponding post in place. Drive this down to its place and, after placing the shelf which supports the drip-pan, clamp this side together. Always use a block of wood to hammer upon. Never strike the frame directly.

Put the other parts of the stand together in a similar way. Allow the glue to dry over night before removing the clamps.

The shelf which supports the drip-pan may be fastened by driving two small nails through each post into it before the glue has had time to set. The nail-holes may be filled with a putty stained to match the finish by mixing some of the filler with it.

If the stand is to be a companion piece to the hall-tree, the same finish may well be used. If not, then any desired finish may be applied, the kind of wood determining the manner of applying it.

The copper-drip pan can be made by the boy. Cut a sheet of copper in the form of a circle, using a three and three-quarter inch radius. If the copper must be bought, the gunsmith will probably cut it to shape.

Prepare a block of wood, Fig. 4, so that it shall be three inches by three inches with a length of six inches.

In one end of this hammer a hollow about one-half an inch deep, having a diameter of about one and one-half inches.

Next, mark off the copper in a series of rings, using the center of the metal as the common center. Any radii will do except that the largest circle should be made so as to be three-quarters of an inch within the one forming the edge of the copper.

Procure or make a wooden mallet, rounding off one end of it so that it shall fit the hole made in the end of the block; the other end should be flat.

Place the copper on the block and, beginning near the center, gradually turn the copper around so as to be able to beat over the hole with the round end of the mallet along the circles made on the copper. Work in this way along the circles until the outer one is reached, then work back toward the center, repeating until the copper is hollowed about an inch.

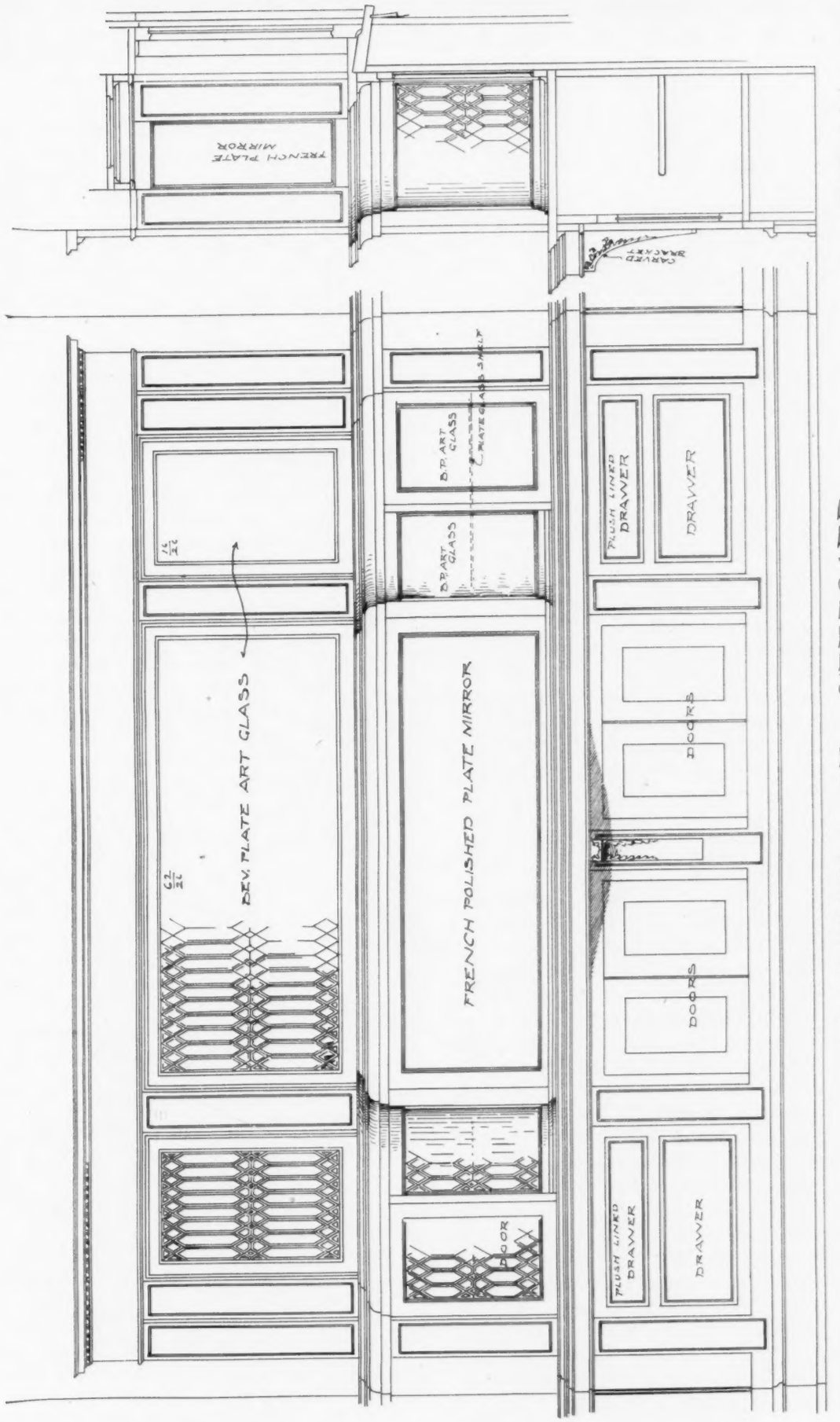
The copper will tend to "buckle" along the outer edge. Turn the pan over and, with the flat end of the mallet beat it back to shape.

The copper may be polished and a coat of lacquer applied or, better, it may be allowed to remain without any further attention.

Brick from the San Francisco Ruins

An important feature in the rebuilding of San Francisco will be the disposition to be made of the many millions of fallen bricks from the ruins. Many of the best will be used after cleaning, a number of machines designed for that purpose being in use. The structural engineers' organization has taken up the subject of investigating the feasibility of utilizing brick bats in making concrete for building purposes. Several instances of their successful use in the vicinity of San Francisco are on record. The effects of the earthquake have demonstrated that concrete containing broken brick has stood well as almost any other concrete.

There are men who make a specialty of manufacturing promises on which they hope to make money.


SECTION
ELEVATION OF SIDEBOARD
FRENCH POLISHED PLATE MIRROR
DEV. PLATE ART GLASS
D.P. ART GLASS
PLUSH LINED DRAWER
DRAWER
DOORS
DOOR

Housewrecking as a Science

THINGS TO BE CONSIDERED BEFORE TAKING UP HOUSEWRECKING—READY MARKET FOUND FOR SECOND-HAND BUILDING MATERIALS—COST OF HOUSEWRECKING

By George E. Walsh

THE carpenter and builder is a constructor rather than a destructor, but the science of housewrecking has come into existence as a necessary part of modern conditions. In a great many instances the ordinary builder is called upon to remodel, remove or tear down an old building to make room for a new one. As a rule this work is very difficult to figure upon, and no job is really disliked more then this unless a pretty wide margin is left for profits. In the case of very old buildings there is little effort made to figure upon any salvage from the house, and the contractor estimates the cost by the amount of time and labor required for the work. If he can obtain a few extra dollars for the lumber for fuel he counts that so much gain.

But the evolution of house building has created great changes in the past few years, and housewrecking has become a science of itself, closely related to that of house building, and yet distinct from it. Old wooden and brick buildings are torn down to-day long before they have served their full time, and the materials used in their construction can be partly recovered as salvage and used or sold for similar uses elsewhere.

This apparent waste of half-used material goes on more rapidly in towns and cities than in the country. A two or three story structure, or a whole row of them, must be torn down to make room for a more modern building. The bricks, lumber, window and door frames and plumbing and heating apparatus are not worn out, and if properly recovered can be converted into salable articles.

The amount of salvage to be obtained in such work is probably best illustrated in the wrecking of such cities as the Chicago, St. Louis and other great fair buildings. In the St. Louis fair there were something like $50,000,000 expended in the buildings and equipments, and all of the structures had to be removed within a few years after the gates were closed to the public. It was natural that an enormous salvage should be expected from such a place, and housewrecking companies, speculators and local carpenters and contractors made bids for the different buildings. No attempt was made to conceal the fact that these companies intended to recover the materials and sell them second-hand. The result of this was that one large wrecking company recovered over 10,000,000 feet of lumber, which they sold from 30 to 50 per cent discount to builders and carpenters all over the country. Besides lumber they disposed of hundreds of tons of nails, nearly ten million feet of piping, thousands of square feet of felt and metal roofing, and great quantities of plumbing materials, bricks, structural iron and window and door frames. It required a 500-page catalogue of this company to describe in detail the different materials obtained from the buildings.

Housewrecking a Science

But it must be remembered also that dozens of small speculators and contractors bought buildings outright and lost money on their investment. Many of them finally sold to the larger companies at a loss. The difference between the two classes of wreckers was that one had reduced the work to a science and knew how to figure upon the value and cost of recovering the material, and the other, basing estimates upon the original cost of the houses were not able to see how much could be recovered and how much the cost of tearing down would amount to. In other words, housewrecking is a science which requires careful study and preparation, and the disposal of the material must be considered as well as the work of recovering it. In the case of the large wrecking companies regular storage places for the materials were provided in advance, and no attempt was made to sell the material at once. Cost of storage and insurance was figured in the contract before the bid was put in. Nearly all good second-hand building material can be eventually sold at a fair profit, but not under hurried or forced sales.

As the carpenter and building contractor may often find it profitable to tear down as well as build up, an exact knowledge of the best methods to pursue is always desirable. In wrecking the St. Louis Fair buildings the average price paid for the different structures was not more than one-tenth of their original cost, and in some instances only one-twentieth. This represents what the big contractors considered the buildings worth to them after they had been standing only one or two years. If they were buildings ten, twenty or thirty years old no such price would be paid for them.

Conditions Governing Value

The conditions which govern the value of a building for second-hand material are various. One of the most important is the market for the salvage. Unless one can dispose of the lumber, bricks, piping, plumbing and frames it is not wise to estimate much on the profits of the second-hand material. Facilities for doing the work and storing the materials after recovery are also important considerations. A carpenter or contractor who has abundant room for storing second-hand material without cost can generally depend upon selling or utilizing the lumber and bricks at various times. The facilities for doing the work of tearing down and removing include skilled labor, special implements and shops for repairing.

The large wrecking companies have repair shops in

connection with their plant where bricks are cleaned and stored; window and door frames cleaned, repaired, painted and numbered; gas and plumbers' piping straightened, repaired and painted; nails straightened and polished and stored, and where all grades of heavy timbers and structural steel work are prepared for second use. The amount of labor required to fit the material for use again depends upon the age of the buildings and the relative condition of the materials.

Working on the lines of the large wrecking companies a contractor should approach the subject from a careful business point of view. If the building is not more than five years old the plumbing, gas piping, main trusses and beams should be in fairly good condition, and it is possible to recover at least sixty per cent of them so that they can be re-sold at prices ranging from 30 to 50 per cent of their original value. It may also pay to recover some of the nails. This, however, only proves profitable where scientific housewrecking is carried on. In a house five years of age or less, it would pay for such work, especially where a number in a row are to be torn down. Scientific housewrecking proceeds along the line of taking a house apart just the opposite to the way the architect had it constructed. Securing the architect's drawings and specifications, it is possible to get pretty well acquainted with the kind of materials used. The lines of the pipes and plumbing can be located, and also the general formation of the framework. With a clear idea of the construction, the work of tearing down should begin from the interior and extend outward.

The plaster and lathes are practically waste, and the simplest way of getting rid of them is to tear them down and pour them into wagons outside through a wooden trough or shoot covered on the top with old bagging to confine the dust and ashes. This wooden shoot can be shifted from the top to the second story and down to the first without much trouble. With the inside plastering and lathing removed, the wrecking should follow more scientific lines. The condition of the studding and joists now exposed should help the wrecker to make calculations upon the amount of salvage that can be obtained.

What Can be Saved

Specially constructed nail extractors and straighteners are used by housewreckers for tearing apart the timbers. These implements extract the nails without bending and breaking them, and at the same time they avoid splitting of the timbers. The shingles of the roof can likewise be removed in the same way, and if the shingles are in good condition they will readily sell at thirty to fifty per cent of the original price. The outside sheathing boards can be removed without destroying more than ten per cent. Some of these will show damage from poor workmanship when the house was first erected, but this can be cut up into shorter lengths later. If the sides of the house are covered with shingles their removal will take from ten to twenty per cent more time and labor and bring only a trifle more as second-class lumber than good sheathing boards.

Floor beams, roof beams, joists and studding should all be in fair condition in a house not more than ten or fifteen years old, and even in older houses the timbers are frequently found of special value owing to their thorough seasoning. Sometimes for particular work such old timber beams command as much as new wood. Veranda posts, floors and beams are not so good as a rule unless the house has been kept in excellent condition. The inside trim and mouldings are of somewhat doubtful value. It is not always possible to fit these in another house without cutting them up a good deal. The cost of removing the paint and varnish is another serious item. When the interior finish is of oak in good condition, the woodwork may be removed so that fifty per cent of the original cost may be obtained as second-hand material.

The gas piping and plumbing should represent good salvage. Gas piping should not degenerate much in five or ten years, and if properly unscrewed the different lengths can be taken apart and painted so that they are practically as good as new. Where lead pipes are used for plumbing the salvage is not so promising, but if iron piping is used the gain is much greater. Wash stands, bowls and closet equipments should be carefully removed, cleaned and polished for future use. These may bring seventy per cent of their original price if not cracked or chipped.

The heating apparatus and water piping are all matters of uncertainty. A second-hand furnace is not worth much, but the elbow pipes and registers may be repaired and painted, so that a ready purchaser can be found. If the house is heated by steam the plant may prove of considerable value, possibly worth sixty to eighty per cent of cost. The foundations of stone are apt to bring little returns, although if in large stones the price may be considerable.

Finally there are many miscellaneous articles of salvage, such as locks, hinges, window fasteners, mantle pieces and stoves which may swell the total returns, provided they are carefully recovered and repaired. The old method of wrecking houses was to pull down the buildings without much regard to salvage. It was wrecking with a vengeance, and the contractor figured upon very little return from second-hand materials. To-day this wasteful method is more than foolish. With proper attention to details and scientific dismantling second-hand materials can be recovered and sold for forty per cent on an average of their first cost. From this must be deducted the extra labor required to recover the articles, cost of repairing and painting, storing and shipping. When houses are wrecked on a large scale contractors often figure on a clear gain of thirty per cent of original cost after deducting all the cost of handling.

Brick houses offer different problems than wooden. Second-hand bricks have a good market for various uses, but purchasers expect to get them cheap The average price for cleaned second-hand bricks is about one-half that of new bricks. But one does not recover fifty per cent of the original cost. From ten to thirty per cent of the bricks in the walls will be broken or chipped, and they can be used only for filling. The labor of cleaning them of mortar is quite an item. Usually this can be intrusted to boys and unskilled labor. In the process of cleaning the bricks a great many more will be chipped and broken so that the total amount recovered will not be large. Bricks properly cleaned and stored away should then find a market in time.

Structural iron framed houses have also come under the hands of the wreckers. The structural iron properly taken down is nearly as good as new, but unfortunately much of it must be cut into new lengths for use in other buildings. This work increases the cost of handling, but even so it proves very profitable. Each length should be painted and numbered before storing, and frequently the right lengths can be kept in stock for many uses. Constructors of greenhouses, garages and stables frequently use the second-hand steel beams and girders, often drawing plans to suit the dimensions of the metal.

Time Required in Wrecking

The contractor who can clearly estimate in advance the probable amount of salvage obtainable from a building has a clear advantage over another who must bid blindly. In the same way the cost of demolishing the structure must be figured upon. How much time and labor does it require to tear down a building and recover as much material as possible as salvage? In the old destructive way it took much less time than when every effort is made to prevent waste. More or less expert workers are required to housewreck properly. There is always more or less risk to the workmen, and this must be considered. Without counting the time spent in cleaning and repairing recovered articles, four men should take down a house in about one-third the time required to put it up, and in some cases only one-fifth the time. Basing wages upon the prevailing rate, a good many housewreckers offer for a building just about what it costs them to demolish it. A fair allowance is left for emergencies, but otherwise a building is worth just what it costs to tear it down. For an ordinary building this may range from $500 up to a thousand or two. A ten thousand dollar building will cost upward of $800 to take it apart, and unless it is comparatively new and well equipped with good timber and hardware it will not pay to bid much above $800 for the salvage in it.

The contractor's profits thus come from the second-hand materials. These may yield all the way from $500 to $2,000, depending upon the skill of the workmen and the market for the goods. In some parts of the country housewreckers sell their second-hand materials direct to dealers in such stock, but when it is cleaned and stored for general sale higher profits are realized.

The demand for second-hand material is increasing in all parts of the country, and to-day there is an enormous trade in it. It serves all the purposes required for small bungalows, cheap summer cottages, ice houses, greenhouses, small barns and outbuildings. Whole colonies of cheap country summer houses have been built of second-hand lumber, which so far as any one knows are just as good as new. Everything depends upon the state of preservation of the material, and this is a matter which the builder must determine for himself. Expert housewreckers and dealers in second-hand building materials have thus become important factors in our modern business movement, and their services are in greater demand every year. With better appliances and facilities for demolishing, cleaning and repairing, they save an enormous amount of material which was formerly counted only as waste.

Saw Mills in England

When attempts were made to introduce saw mills in England they were violently opposed, because it was apprehended that the sawyers would be deprived by them of their means of getting a subsistence. For this reason it was found necessary to abandon a saw mill erected by a Dutchman near London in 1663; and in the year 1700 when one Houghton laid before the nation the advantages of such a mill, he expressed his apprehension that it might excite the rage of the populace. What he dreaded was actually the case in 1767 or 1768, when an opulent timber merchant, by the desire and approbation of the Society of Arts, caused a saw mill, driven by wind, to be erected at Limehouse under the direction of James Stansfield, who had learned in Holland and Norway the art of constructing and managing machines of that kind. A mob assembled and pulled the mill to pieces; but the damage was made good by the nation, and some of the rioters were punished. A new mill was afterward erected, which was suffered to work without molestation, and which gave occasion to the erection of others. It appears, however, that this was not the only mill of the kind then in Britain, for one driven also by wind was built at Leith some years earlier.

Concrete Block Machine Convention

The Concrete Block Machine Manufacturers' Convention, which will be held at Detroit, Aug. 8 and 9, will make its headquarters at the Wayne Hotel. All meetings will also be held here. There will be no exhibits, but a number of interesting and instructive papers will be read.

Never jump at a conclusion or opinion beyond your experience; approach it only with careful diplomatic discretion.

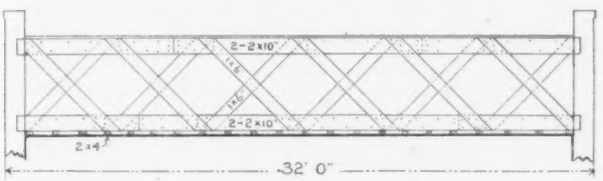
Concrete Form and Trussed Roof

To the Editor: Stockwell, Ind.

I have two questions that I would like to have answered.

First. What is the best way for making form for a concrete wall, say about 18 feet high? As it would require a great amount of lumber to make a form from the bottom up, I thought perhaps there was a way to make a moving or sliding form.

Second. How would you frame a roof for a building 32 feet wide and 120 feet long? The roof to slope from front



to the rear and no supporting posts to be used. Have been thinking of putting in trusses every fifteen feet, but the space gets narrower as they lead to the rear. Wm. W. Lehr.

Answer: First question. Yes, a sliding form can be made by setting studding about three feet apart, and toe nail through the studding into the planing. The nails can be drawn and the planking raised as desired.

Second question. Would recommend building lattice truss joists as per the accompanying illustration, set on 32-inch centers. The latticing to be placed on both sides and at an angle of 45 degrees, and to be placed in the same proportion as here shown. The last truss to be 2 feet deep. 2 by 4 pieces are nailed to the under side, on which to lath and plaster. Would use 1 by 6 tongue and grooved boards for the roof sheathing. Editor.

Color to Imitate Granite

To the Editor: Scott City, Kans.

We have a plasterer here who says he has used a water color on Plaster Paris, satin finish, that makes the walls resemble granite, but does not know what the color is. The color is applied with a brush by dashing or sprinkling. If you can inform us about this we will be greatly obliged to you. Don S. Farman.

Answer: We have made a number of inquiries, but have been unable to learn of any special water color paint for the purpose of imitating granite. We presume that this effect might be obtained by using any of the prepared hot or cold water calcimines (such as Muresco or Calcimo), dashing it on as suggested to make a series of irregular dots of properly blended colors.

If oil color were to be used, the work would be done by giving the wall a ground color of light gray or lead color. The black and the white for spattering should be mixed with enough turpentine to prevent them from running. The work must be done with a stubby and broad brush, which must not be too full of color. First the black and then the white is spattered on by striking the brush against a heavy stick which is held close to the work. For red granite the ground should be a salmon tint, while the spatter colors are black, red and white. The same general method could probably be followed with water color. Editor.

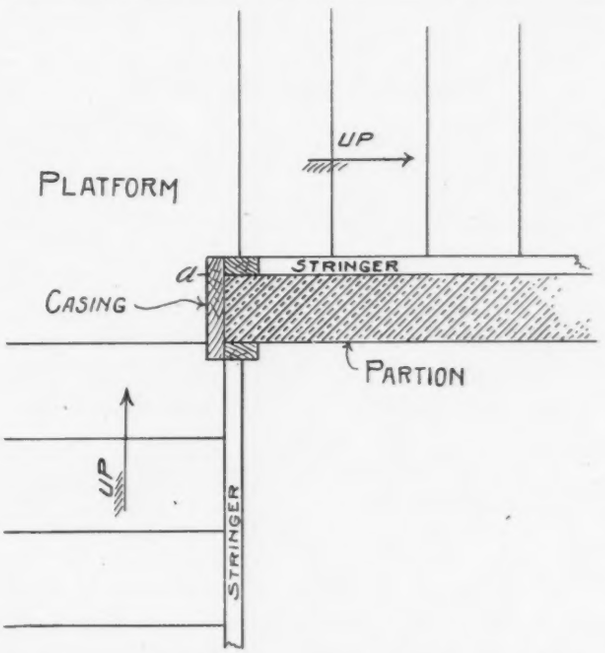
Stair Construction

To the Editor: North Liberty, Ind.

In finishing the base in column partitions is it proper to extend the base board and cap mould around the base of the pedestal, or butt base and moulding against the pedestal. In constructing open stairway where the stairs have a landing and the lower part of the stairway is open and the upper part is closed from the landing to the floor, how would you connect the stair string with the angle newel, as in this case the string would come on the inside of the angle newel.

Abraham Sheneman.

Answer: We propose the solution exemplified in the accompanying sketch of the inquiry submitted by Mr. Sheneman



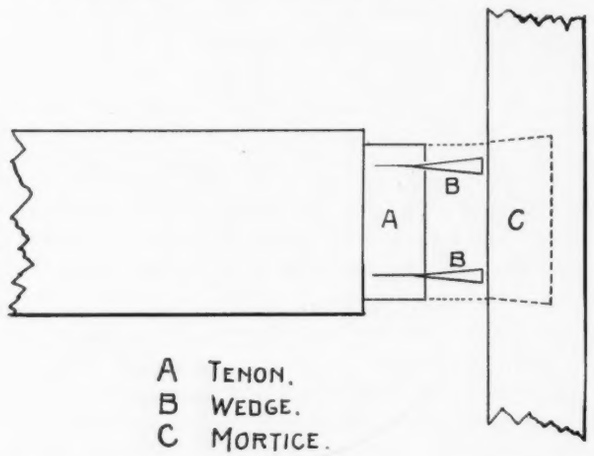
in which it is shown that we omit the angle newel in the intersection of the two flights at the platform. In place of which we continue the portion enclosing the upper flight far enough into the platform as shown at A to receive the stringer of the bottom flight. At the angle the portion is shown closed with stuff equal in thickness to the thickness of the stringers and the stringer of the closed upper flight which is on the inside of the portion will butt against the

casing. The rail of the bottom flight will be fastened to the casing above the bottom stringer, while the rail for the upper flight will have to be fastened on brackets to the side of the portion and is known as a wall rail. EDITOR.

How to Make a Wedge Tenon Door

To the Editor: Franklin, Nebr.

Will you tell me the proper way to put a panel door together? I am making some odd-sized doors, but I never saw any put together without pinning through the style and



tenon. I enclose sketch showing the way I am doing mine, but had trouble getting the first one to draw up and make good joints. A. C. DILL.

Answer: We herewith reproduce Mr. Dill's sketch. The method is all right. It is quite likely Mr. Dill made his wedges too large, which was the cause of the joints not closing up. The tenon should be saw kerfed so as to guide the wedges true. EDITOR.

Kerfing Ogee Moulding

To the Editor: Wiconisco, Pa.

I have noticed in some of the magazines methods for kerfing. To kerf a board one inch thick for around a circle is easily understood. But I think it is impossible to kerf a straight piece of ogee moulding that is to fit level around

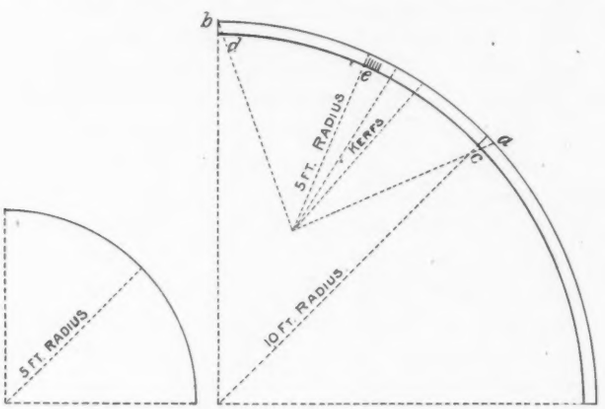


FIG. 1. FIG. 2.

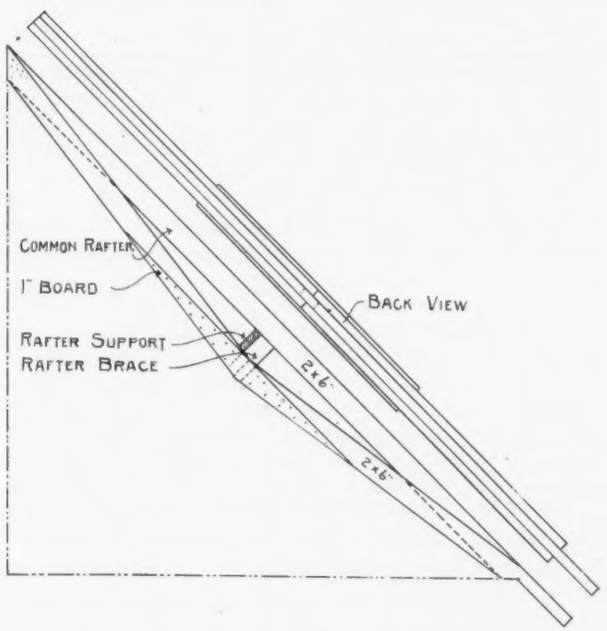
a circle. But enclosed you will find my method of working the ogee moulding, also how to kerf it after it is worked (to keep it up level).

Fig. 1 is one-fourth of a circle with a five-foot radius which the moulding is to go around. First we take a board the desired thickness of your moulding, say one and one-fourth inches thick before it is worked out. Then with ten feet as the radius describe the arc a-b, Fig. 2, and measure in the width of your moulding and with same radius describe another arc as c-d. Now as one-eighth of the circumference of a circle with a ten-foot radius is equal to one-fourth of the circumference of a circle with a five-foot radius, you will notice in Fig. 2 that only one-eighth of the circle is taken, allowing a few inches for cutting away of kerfs. You are now ready to make it in the shape of ogee, but this will not yet fit around the curve; you must kerf it first. Now with five feet as a radius as shown in Fig. 2 from e to f with f as a center, let all the kerfs radiate from it as shown in Fig. 2 in the sketch. All this being done, it is best to steam it before bending it. I think I have explained it fully enough for the young American carpenter and builder to understand and hope he will grasp it and hold it in his memory for future use. PETER C. BODDORFF.

A Queen Rafter and How it is Used

To the Editor: Galesburg, N. D.

Enclosed you will find a sketch of what we here call a queen rafter. It is used for barns up to 34 feet wide without putting in purlins. I would like to know which is the best



way to support a plain roof on a square pitch barn 30 feet wide, the floor being 6½ feet below the plate. F. S. HANGEN.

Answer: The accompanying illustration is prepared from Mr. Hangen's sketch, and while we believe it possesses considerable merit for stiffening the roof, there is nothing in it to keep the sides of the building from spreading, as it does not form a tie which is necessary when the loft floor is so far below the plate. We would recommend for a barn of this width (30 feet), to use 2 by 6 rafters set on 24-inch centers, and put on the sheathing diagonally toward the center close and well nailed. The center rafters where the sheathing meet should be doubled and well spiked together The floor joist lap on to each stud and should be well nailed to prevent spreading. EDITOR.

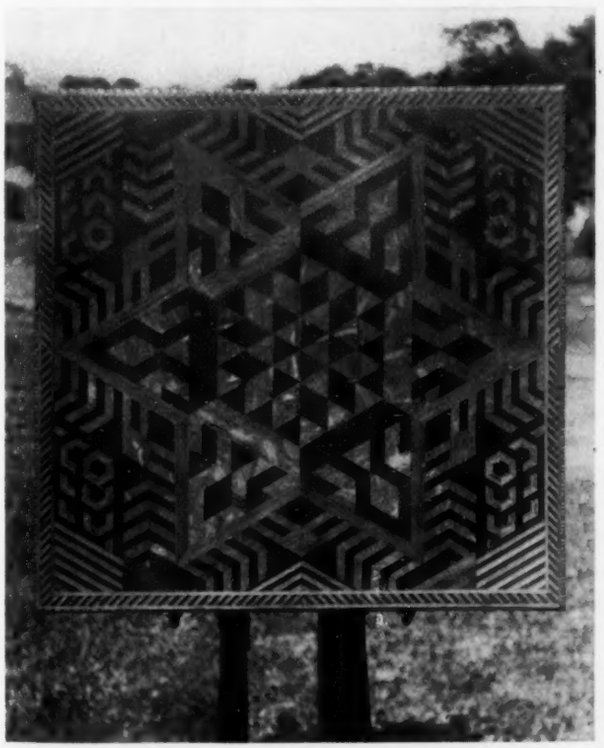
Suggestions for the Carpenter

To the Editor: Equality, Ill.

I am sending you herewith photographs of a table which I made last winter and I must thank our valuable paper, as I

received my first inspirations in miter work on page 481 of the October number. The top of the table is twenty-eight inches square and the table contains over nineteen hundred

pieces of wood. Work of this nature is good practice for the village carpenter or any other carpenter who is not profitably employed during the winter season. The work, of course, must be very accurate in order to carry out a design of this



character. Instead of resting through the winter, something of this sort will keep us out of mischief and encourage a spirit of neatness and exactness, which is something we all need. Let us hear from the rest of you boys when you make something out of the ordinary, as we will be pleased to see how it looks.

J. H. GODFREY.

✤

Standing Gutter on Circular Porch

Mc Clelland, Iowa.

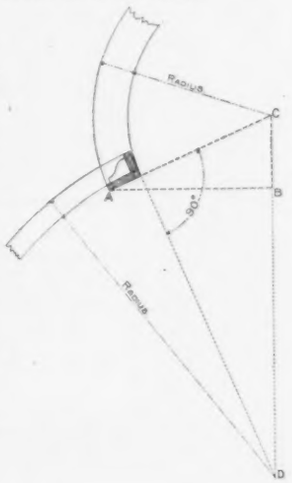
To the Editor:

I have a circular porch roof on which I wish to put a standing gutter. How can I get the cvrve to fit the roof?

F. W. BRISTOL.

Answer: Lay out a full size diagram as shown by the accompanying illustration. Let A-B represent the run and B-C the rise. If there is a board to lay flatwise on the roof, the center from which to strike the curve will be at C. , The back of the gutter stands at right angles to the above board and a continued line from its face intersecting the plumb line at D will be the center from which to strike its curve. If it is necessary to do any kerfing the cuts should radiate to these centers.

A. W. WOODS.



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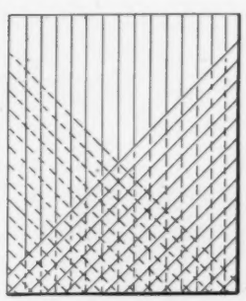
How to Make Barn Doors

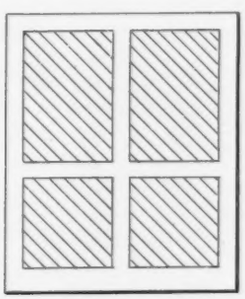
To the Editor: Gridley, Kans.

I am building quite a large barn and am siding with drop siding. Will you give the best method of making the doors so as not to take up too much room in thickness? An early reply will oblige,

BEN HERITAGE.

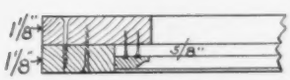
Answer: We herewith produce two sectional drawings with elevations suitable for barn doors. The first is made of





SECTION

FIG. 1.



SECTION.

FIG. 2.

three thicknesses of boards as shown. The center is of 7/8 inch boards placed vertically and 5/8 ceiling placed diagonally on both sides, covering the whole space and well nailed. This will make a door 2 1/8 inches thick.

The second is made of two 1 1/8-inch pieces for the frame work lapped and screwed together. The panel work is made of 5/8 ceiling cut in and nailed with a stop mould to cover the nail heads. Would paint all the laps and joints with white lead paint. This will make a door 2 1/4 inches thick.

EDITOR.

PRACTICAL TRADE APPLIANCES

A Perfect Floor Spring Hinge

After a half century of spring hinge manufacturing, the Columbian Hardware Co. of Cleveland, Ohio, have perfected a spring hinge, their Columian Floor Spring Hinge, which has a maximum of desirable features and wearing qualities.

This hinge has been on the market several years, and this concern now feel that they are justified in claiming that in action and after a fair trial the Columbian lives up to the reputation they have given it.

One very novel feature is the loose top pivot (see Fig. A). One of the top parts contains a pivot held in place by a spring.

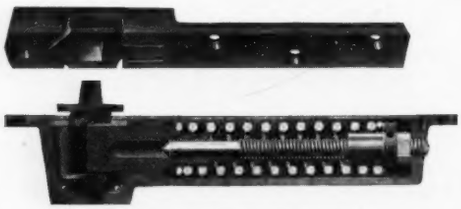


FIG. A. TOP PIVOT OF HINGE.

If it is desired to take down the door, simply swing it around until slot is exposed as shown. Then insert a knife in slot and pivot may be raised, releasing the door; the entire operation not taking over ten seconds.

Another exclusive feature is the depth of the box containing working parts, which sets into the floor.

The Columbian is only 1¾ inches greatest depth, and is therefore just the depth of a double floor. (See Fig. B.) This makes it possible to set the Columbian over an I-beam or over a joist without cutting into same, overcoming a serious objection to other styles.

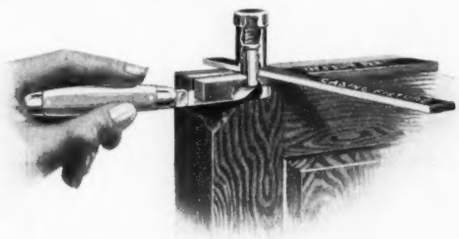


FIG. B. SECTIONAL VIEW OF HINGE.

Still another feature exclusively Columbian is the lack of side plates to disfigure the door. These are not necessary with the Columbian, and all parts which set in the door are invisible, so that the Columbian is practically an invisible floor spring hinge. Only a narrow top plate is visible, the top plate being just the width of a single strip of hardwood flooring, so that only one strip need be removed to install the hinge.

As doors differ in weight, being made heavier or lighter than ordinary, it is necessary to have a floor spring hinge whose tension may be adjusted for these special cases.

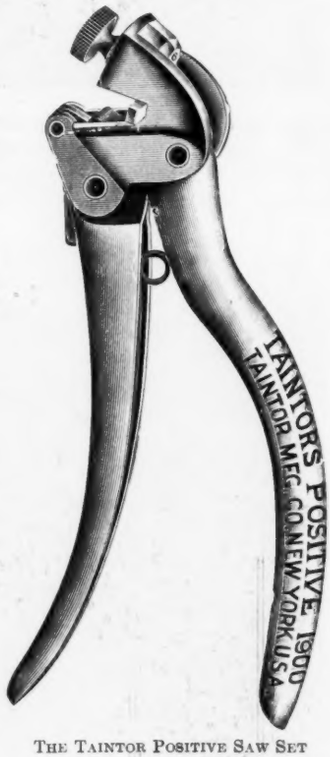
To adjust the tension of the Columbian Floor Spring Hinge after it is in place, simply swing the door around until the floor box is exposed. Remove the screw holding the top plate and top plate may be displaced, giving access to the ratchet, which may be turned around until desired tension is secured. Note that it is unnecessary to remove the door or any part of hinge.

All working parts are protected against dirt and moisture, and the hinge is simple in construction and compact.

Their catalogue, No. 12, gives A host of other good points and describes twenty other styles of spring hinges, both new and old.

The Taintor Positive Saw Set

The Taintor Mfg. Company, 113 Chambers street, New York City, are making the Taintor Positive Saw Set, which is represented in the accompanying illustrations. The Taintor Saw Set consists of a frame to which are attached two movable handles, an anvil and punch. A spring holds the handles apart. In use the upper handle first clamps the saw against the side (lower part) of the anvil. The lower handle carries the punch which forces the tooth against the face of the anvil. This is accomplished instantly, and the operator does not realize that both handles have moved.



THE TAINTOR POSITIVE SAW SET

The anvil, Fig. 2, has ten sides, and can be revolved to provide for different depths of set of saw teeth. The faces are of three lengths placed in lettered divisions—F for fine, M for medium and C for coarse teeth. These faces will produce any setting ordinarily required, but for fine adjustment a washer is provided, which when placed between the anvil and frame causes each face to bend the tooth nearer its point, producing less set. Twenty adjustments are thus obtained. In operating the anvil is screwed down with the selected face in line with the clamping jaw. The tool is then placed on the center line with the tooth to be set, and the handles are pressed together hard enough to force the tooth solidly against the anvil, but not with power sufficient to crush it. The several faces of the anvil being numbered any one can be brought into action readily and accurately, and any setting on the same saw may obviously be repeated.

If the anvil faces reach too low to suit the requirements of

WHEN we make the statement that a great majority of all the important buildings and manufacturing plants of the country are roofed with Coal Tar. Pitch and Felt along the lines advocated in the Barrett Specification, it would seem as if no higher commendation could be secured.

Yet added evidence of its value is the fact that the foundation walls and cellars in most of these structures are also waterproofed with the same materials. The famous Trinity Building, New York, illustrated herewith, is an example of this.

THE BARRETT SPECIFICATION ROOF is the most suitable, satisfactory and economical known. The practical application of this fact is daily demonstrated by every reputable roofing contractor in that he will guarantee such a roof *absolutely* for at least ten years, as against the *qualified and provisional guarantee* given with other roofings.

Metal, and most "ready roofings" require coating or painting every two or three years. Failure to do this, either through oversight or false economy, causes such roofs to quickly rust or rot out, and leak. Thousands of dollars worth of merchandise are destroyed annually through leaky roofs.

The Barrett Hand Book, covering the subjects of roofing and waterproofing, will be mailed free on application.

Barrett Manufacturing Company

New York Philadelphia New Orleans Allegheny
Cleveland Chicago St. Louis Cincinnati
Kansas City Minneapolis Boston

the user, the anvil can be raised by placing the washer between the anvil and the frame. Both the punch and the anvil can be readily changed, the former by driving out the supporting pin, and the latter by the use of the milled head screw which holds it to the frame. The tool gives all the teeth of a saw uniform pitch, bevel and set, while the different faces of the anvil provide for giving a saw just the necessary set to cause it to run freely.

FACE OF ANVIL
(Full Size)

The motion of the plunger is in the same direction as that of the tooth set so that it does not curl the tooth at the point. The Saw Set does not cut, crease or otherwise injure the teeth, but leaves them in the best possible shape and slightly concaved on the inside. The tool is self-adjusting except that the anvil must be turned to change the setting. The Saw Set is made entirely of steel, is light, strong and durable, and every part is interchangeable and guaranteed.

Carpenter's Pencils for the Asking

We have a sample of a large, brilliant, red and black varnished carpenter's pencil, with extra large lead. It is handed us by the Hess Warming & Ventilating Company, who tell us they have thousands of them to give away in return for postal cards bearing certain information (see advertisement, page 593.)

We expect soon to see all our readers decorated with these useful and showy reminders of the aggressive methods employed by the Hess Warming & Ventilating Company to attract attention to its Leader Steel Furnaces, and its system of selling by mail, direct to consumers.

A Face-Down Machine

The Superior concrete block machine manufactured by The T. O. Eichelberger Co., Miamisburg, Ohio, makes the stone with the face down, or in the bottom of the flask, which permits the use of fine rich material for the face and a much courser, cheaper material for the main body of the stone.

By tamping directly upon the face, a far more uniform and superior face is made than can be produced on any machine making the face on the side or otherwise. When they are made in any other manner the same kind of material must be used throughout, making them more expensive and less desirable.

The stone made with the Superior machine is an exact imitation of fine cut Bedford or other natural stone at a moderate cost of production. The blocks have large oblong openings through them, which insure perfect ventilation and a dry wall. They are laid in the wall with close joints, hence do not require a skilled mason to lay them. They have a recess running around both sides and ends for receiving the mortar or liquid cement, which completely binds them together in the center and on the ends, making the most substantial wall possible. The front and back edges lying tight together prevent the mortar or cement from running out over the face of the blocks and marring their appearance. They are discharged from the machine with the face up, on inexpensive wooden pallets on which they are taken to the curing shed. This saves a large outlay of money necessary with other makes of machines which discharge the blocks on expensive iron pallets, and when you consider that it requires five or six hundred of these pallets to properly operate a machine you can readily appreciate what this item means.

The Superior machine makes a number of styles and shapes of blocks. Both the machine and samples of blocks are on exhibition at the office of Adams & Co., Room 604, No. 115 Dearborn St., General Agents, Chicago, Ill., where they invite inspection.

Taking Care of their Customers

The Miracle Pressed Stone Company of Minneapolis, Minn., who are large users of advertising space in exploiting their various products, and whose business has had a remarkable growth during the past year, was requested by the AMERICAN CARPENTER AND BUILDER recently to give the readers of this magazine an insight into the manner in which they "followed up" the inquiries resulting from their advertising. In response to our request the Miracle Pressed Stone Company have written us, and we take pleasure in publishing their letter. They say:

"We have recently tested the general public interest in concrete by announcements in the larger magazines of the country. The results have been surprising. Over six hundred prospective builders wrote us after seeing our add in a certain June issue and you may be sure that thousands of prospective builders saw the add, who did not write. In other words, we are sure of sufficient interest in concrete to warrant the further and more extensive advertising which we have already placed for September and October.

"The primary object of this advertising is to stimulate further interest generally in concrete and a particular interest in Miracle Concrete and our Double Staggered Air Space Block.

"In this way we hope to increase the demand for our machinery, of course, because that is our business, but the fact remains that we are especially endeavoring to create a larger demand for our block. In other words, we are undertaking

Classified Advertisements.

Advertisements under this heading will be inserted at the following rates:
One month.....$0.45 per line
Three months..... 1.25 per line
Six months..... 2.25 per line
One year..... 4.25 per line
Count 10 words to the line. **Situations wanted one-half above rates.** Replies may be addressed in our care and will be promptly forwarded.

For Sale.

STEEL SQUARE POCKET FOLDER, with booklet, in leather case, 25 cents. Dwight L. Stoddard, 328 Raymond St., Indianapolis, Ind.

FOR SALE OR TRADE—For sawmill or any other woodworking machinery, one nearly new Winget concrete machine with nearly an A outfit and about 6,500 pallets. Write for full list; whole outfit cost about $800. Address Lock Box No. 38, Carmi, Ill.

FOR SALE.—A sash and door factory and planing mill for sale. Run by excellent water power. Located in a prosperous Wisconsin town of 4,500 inhabitants. Address, | Planing Mill, care of American Carpenter and Builder, Chicago.

WANTED men with money to invest in the concrete block and machinery business; have a two-piece system; also a power press of 100 tons pressure. Send $1.00 for blue prints. Chas. A. Meyers, 2202 Locust St., Toledo, Ohio.

Legal Advice.

$1. BEST LEGAL ADVICE on any subject. Strictly Confidential. Arguments and briefs for lawyers. Our book free. $1. Associated Lawyers Co., Old South Building, Boston, Mass.

PATENT secured or no fee: opinion free. Write about any legal business, including United States Supreme Court. E. W. R. Ewing, Attorney, Washington, D. C.

Wanted.

WANTED experienced all-round planing mill foreman for mill doing odd work principally; good estimator, detailer, etc., capable of making cutting bills from plans; best of references required. Address Z, American Carpenter and Builder.

WANTED—Position as foreman or general superintendent of house building; ten years' experience in same place; desire to change location; best references; practical mechanic and draftsman; age 35. Address Mechanic, care American Carpenter and Builder.

SALESMEN wanted for our protection for men and women. $1,000 Policy pays $7.50 a week with $100 emergency benefit. Costs $2 a year. Handome seal wallet given free with each policy. Write today for renewal contracts with liberal commissions. The Guarantee Registry Co., Cleveland, Ohio.

Catalogues.

IF YOU WANT to buy a machine, engine, boiler, power equipment, electrical, steam, pneumatic or any other machinery—anything in the machine line—Tell Us what you want and we will see that you get full descriptions, prices, catalogs, etc., from all the first-class manufacturers in that line. We charge nothing for the service. Address, Modern Machinery Daily News Security Building, Suite 196, Chicago.

A FINE 24-page illustrated booklet of Brule County and map of So. Dakota, free. Farms and ranches in famous Missouri Valley, corn belt of South Dakota. Profits guaranteed. J. A. Stransky, Box 603, Pukwana, S. D.

IF INTENDING TO BUILD send stamp for our catalogue; has 27 plans of inexpensive, modern houses, with photos. Complete working plans and specifications from $1 up. The C. E. Eastman Co., Architects, Des Moines, Iowa. DO IT NOW.

WATCH TACOMA GROW. Population in 1880, 1098; in 1900, 37,714; January 1, 1906, 85,000. Send ten cents in postage for illustrated booklet descriptive of the Electric City of the Pacific Coast to Secretary Chamber of Commerce and Board of Trade, Tacoma, Washington.

Moth Destroyer.

HANDY MOTH PAPER destroys moth at all stages. A packet is usually enough for a home, for one season. Postpaid. 10 cents. Madigan, Powder Works, Selection 450. Clarksville, Iowa.

Johnson's Electric Solvo

"A Perfect Remover of all Finish from Wood, Metal and Glass"

Eight Points of Superiority

1. Softens old finish so that surface may be wiped clean in three minutes.

2. Has no objectionable odor.

3. Will not injure the hands.

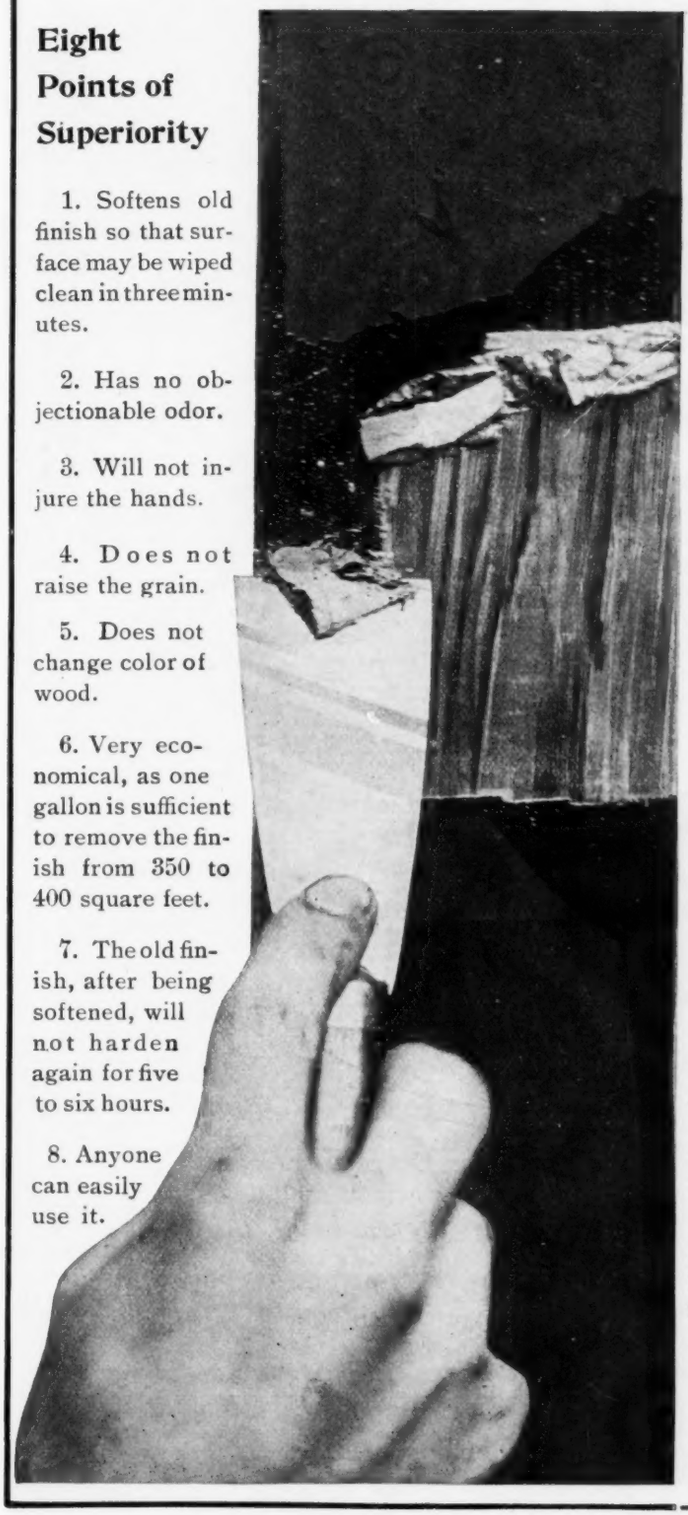
4. Does not raise the grain.

5. Does not change color of wood.

6. Very economical, as one gallon is sufficient to remove the finish from 350 to 400 square feet.

7. The old finish, after being softened, will not harden again for five to six hours.

8. Anyone can easily use it.



Special FREE Offer

If you do not regularly use Johnson's Electric Solvo and will send us your paint dealer's name, we will send you a sample can absolutely FREE prepaid. Don't miss this offer—send now. Mention this publication.

This preparation is the most effective, most economical and easiest applied softener of paint, varnish, enamel, shellac, wax or any finish on wood, metal or glass. It will not harm the finest wood, but will quickly and thoroughly soften the finish so that it may be removed with putty knife. The old finish remains soft for three hours, giving ample time to remove. Solvo is fine for softening putty in window sashes and for cleaning paint and varnish brushes.

Johnson's Electric Solvo

is sold by all dealers in paint.

One-half Pint Cans, $0.25	Quart Cans....$0.75
Pint Cans.....40	Gallon Cans....2.50

FREE Offer

If you will give us on coupon herewith the name and address of your paint dealer, we will send you FREE postpaid a copy of our new book, "The Proper Treatment for Floors, Woodwork and Furniture"—regular 25c. edition. This is the finest book of its kind ever published. It is written by an expert, illustrated from life and printed in six colors. Don't delay, send to-day. Don't forget dealer's name.

S. C. Johnson & Son,

Racine, Wis.

"The Wood Finishing Authorities"

ACB8

S. C. Johnson & Son. Racine, Wis.

Gentlemen:—Mypaint dealer's name is .....

.....

Address.....

.....

for which plese send me FREE your new illustrated book "Proper Treatment for Floors, Woodwork and Furniture," regular 25c. edition

Name.....

.....

Address.....

to increase the demand for Miracle Blocks sufficiently to increase the demand for our machinery. Any business resulting is very gladly turned over to our customers free of expense to them, because we do not make the block. You will recognize the 'snap' for them. It is certainly 'getting something for nothing' and they would appreciate it more if they knew what it was costing us. As the months roll by, they will all have good reason to thank us as have a great many already.

"For those who are in a position to go into the cement building block manufacturing business, this offers an exceptional opportunity to get something for nothing, not only now but as long as they make the Miracle Block. The longer they are at it, the more they get for nothing, on account of the accumulated effect of advertising, and the sooner they get busy, the better they'll feel to know that they got in on the ground floor before the other fellow."

The Miracle Pressed Stone Company give some very strong reasons why their machines are popular in their advertisement on the third page of the cover of this month's number of the AMERICAN CARPENTER AND BUILDER.

An Attractive Catalog

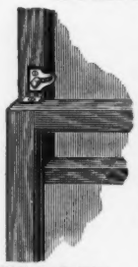
One of the most attractively illustrated catalogs of recent issue is that being sent out by the Hayden Automatic Block Machine Co., of Columbus, Ohio. It is generously illustrated with the various products of this concern and contains a large number of new styles of concrete blocks, balls, posts, etc. The cover design is very attractive and altogether it makes a handsome addition to their large line of literature.

Review of "The Orders"

The American School of Correspondence have issued a new work on "The Orders" which is a simple treatise on The Five Orders of Architecture. It is prepared especially to give the students of architecture in a concise, interesting form a clear description of the Classic Orders and the system of proportions. These orders were reduced by the architects of a later date. The work consists of over 400 pages of text, is profusely illustrated and handsomely bound with a Glossary of all architectural terms in common use and a complete index. The text is supplemented by fifty-eight valuable detailed drawings of the best typical examples of Greek and Roman architecture. These plates are 11 by 15 inches in size, printed on heavy plate paper and provided with a handsome portfolio convenient for desk use. Among the authors of the work are Frank Chouteau Brown, Frank A. Bourne, H. V. Von Holst, J. R. Coolidge, Jr., and the editor, A. E. Zapf, who is at the head of the department of Architecture of the American School of Correspondence. You can receive further information by writing to the American School of Correspondence, Chicago, Ill., and mentioning the AMERICAN CARPENTER AND BUILDER.

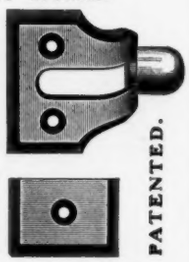
SPECIAL OFFER TO CARPENTERS

BUILDERS AND OWNERS OF HOMES



Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.

To introduce this article, Four Ventilating Locks in Genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a fifty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address,



PATENTED.

THE H. B. IVES CO.

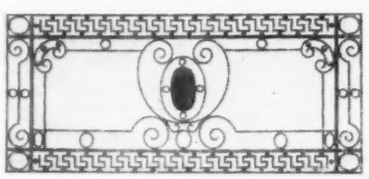
NEW HAVEN, CONN., U. S. A.

A $20 Watch for $5.45

These figures tell exactly what we are doing—selling a $20.00 watch for **$5.45.** We don't claim that this is a $40.00 watch or a $50.00 watch, but it is a **$20.00 watch.** A leading watch manufacturer, being hard pressed for ready cash, recently sold us 100,000 watches—watches actually built to retail at $20.00. There is no doubt that we could wholesale them to dealers for $12.00 or $13.00, but this would involve a great amount of labor, time and expense. In the end our profit would be little more than it is at selling the watch direct to the consumer at $5.45. **The Evington Watch,** which we offer at **$5.45** is an im. **21 jewel,** finely balanced and perfectly adjusted movement. It has specially selected jewels, dust band, patent regulator, enameled dial jeweled compensation balance, **double hunting case, genuine gold-laid** and handsomely engraved. Each watch is thoroughly timed, tested and regulated, before leaving the factory and both the case and movement are **guaranteed for 25 years.**

Clip out this advertisement and mail it to us today with your name, postoffice address and nearest express office. Tell us whether you want a lady's or gent's watch and we will send the watch to your express office at once. If it **satisfies** you after a careful examination, pay the express agent $5.45 and express charges and the watch is yours, but if it doesn't please you return it to us **at our expense. A 25-Year Guarantee** will be placed in the front case of the watch we send you and to the first 10,000 customers we will send a beautiful gold-laid watch chain free. **We refer to the** First National Bank of Chicago, Capital $10,000,000.

NATIONAL CONSOLIDATED WATCH CO., Dep. 447 Chicago



ORNAMENTAL IRON AND BRONZE WORK

ELEVATOR CABS, ENCLOSURES, BANK GRILLES AND CAGES
HEAVY IRON FENCES, WINDOW GUARDS, STALL FIXTURES, ETC.

Write for Catalogue

DOW IRON AND WIREWORKS, Louisville, Ky.

GRILLES "Direct from Factory" MANTELS

This No. A18 Oak Grille 14 inches deep with curtain pole, finished at $5.00 for sizes up to 5 ft., over 5 ft. add 60 cents lineal ft. Division Screens and Special Grilles to order.

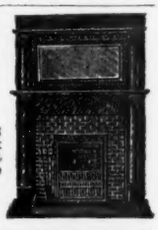
Hardwood Floors will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Send for designs.

Write for catalog of Mantels, Grates, Tiles for floors and baths; Slate Laundry Tubs; Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

TILE AND MOSAICS

For Everywhere, Walls, Floors, etc.

$14.25 buys this Solid Oak Four Column Mantel. It is 80 in. high, 54 or 60 in. wide, 36x18 bevel edge Mirror. Four Elaborate Capitals. Quarter-Oak Veneer Columns. Above Mantel with two long columns at same price. Tile Facing and Hearth, with Plated Frame and Clubhouse Grate, $10.00 extra.



Get Our Prices.

W. A. OSTENDORF, 2923 North Broad Street, Philadelphia, Pa.

The American Combined Level and Grade Finder

SOMETHING ALTOGETHER NEW

All progressive and up-to-date Mechanics, Machinists, Carpenters, Bricklayers, Masons, Plumbers, Millwrights, Road Supervisors, Track Foremen, Surveyors, Architects, Civil Engineers and others will find this an Indispensable Invention.

A Civil Engineer that you may have with you at all times. The most practicable, durable and convenient instrument of the day.

The cost of the instrument is so low that it is within the reach of all. **Agents wanted on liberal terms.** Apply to

EDWARD HELB, Railroad, Pa., Manufacturer

SEND FOR OUR CATALOG, "HOME HEATING"

UNITED STATES

HOT-WATER HEATED $198 EACH by ANDREWS SYSTEM

ALASKA

14 ANDREWS HEATERS IN ONE BLOCK — AVERAGE PRICE $198.00

IT IS WELL WORTH READING

NEW FOUNDLAND

1906 CATALOG Of Hot Water and Steam Heating

Our new catalog explains fully the principles and advantages of hot water heating, based on 18 years' experience in the cold Northwest, and describes how any carpenter or mechanic can erect the Andrews System in any building from complete plans and directions which we send with each heating plant, saving plumbers' charges.

This book should be in the hands of every contractor and builder. Send your address and names and addresses of two other people who expect to buy heating plants, and we will send our catalog postpaid.

WE DO IT RIGHT IN 44 STATES, CANADA AND ALASKA. Our catalog contains a partial list of our customers from all parts of the country. Look them up and examine the Andrews System in your vicinity.

PRICES. We will sell you the plant with all material complete pipe cut to fit so you can erect it yourself. The cost of each heating plant here shown is based on Minnesota climate and includes an Andrews Steel Boiler, richly ornamented radiators, for every room except the kitchen, pipe cut to fit, fittings, valves, gold bronze, brushes and all other material ready for use, with diagrams and directions so plain and simple that any man handy with tools can erect the plant and save money. You can in this way include the heating plant in your general contract for the building.

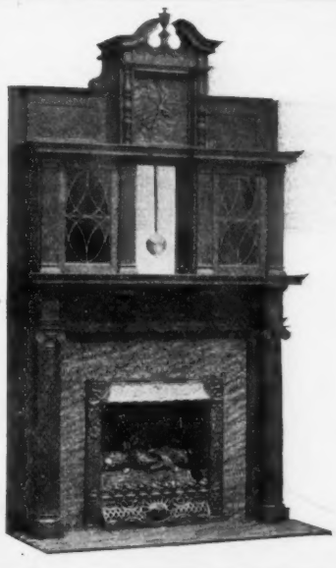
FACTORY TO USER. We design, manufacture, guarantee and sell each plant direct from Factory to User, giving you the lowest price for the value. Estimates free. ALL PLANTS GUARANTEED AND SOLD ON 360 DAYS' TRIAL FREE. Freight rates equalized. **Old Houses Easily Heated.**

ANDREWS HEATING CO.

97 LaSalle Building, Chicago
397 Hennepin Ave., Minneapolis

CANADA

MANUFACTURERS CONTRACTORS CONSULTING ENGINEERS



EAST - WEST - NORTH - SOUTH

In all directions we are shipping

Burritt Mantels

And they are giving universal satisfaction. Mantels that are well made and beautifully finished, with the right price tacked on—**That's the Burritt kind.** Try us on that next order, and if you are not satisfied ship back the goods. That's fair, isn't it? If you are building, it will pay you to write **today** for our catalogue with best prices, **Freight Prepaid,** to your station.

The A. W. Burritt Co.

"The Mantel Folks"

450 Knowlton Street - Bridgeport, Connecticut

SLATE WE HAVE WHAT YOU WANT

In Roofing Slate, Slate Blackboards
Structural and Plumbers' Slate

SATISFACTION GUARANTEED IN QUALITY AND PRICE

ASK FOR DELIVERED PRICES

J. K. HOWER, Station C., Slatington, Pa.

H. J. KICHLINE, Sales Agent

WHO WANTS SLATE?

Roofing Slate for Houses, Barns, &c. Always clean, beautiful and fireproof.
Blackboards for Schools, Colleges, &c. Needs no commendation; universally used all over this and other countries.
Structural Slate. Electrical Stock, Sinks, Troughs, Washtubs, &c. Superior to all stone for such purposes.
Slater's Supplies. Handmade Slating Tools, Felt, Cement, Nails, Snow-guards, Punching Machines, &c.
Write for prices and I will tell you all about Slate.

DAVID McKENNA, Slatington, Pa., U. S. A.

PATENTS

Valuable and Salable Patents Promply Secured. Advice as to Patentability and Commercial Value Free. :: :: Write for Inventor's Hand Book.

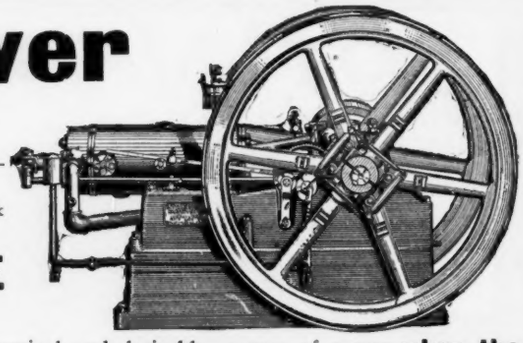
Shepherd & Parker, Patent Lawyers.

"During the past ten years Mr. Shepherd, of Shepherd & Parker, has obtained for us a great many important patents. We have no hesitation in heartily recommending him to any one having need of the services of a patent attorney. HALLWOOD CASH REGISTER CO.

Mr. Parker on Nov. 1, 1903, resigned his position as an examiner in the U. S. Patent Office to enter this firm. Address, Dietz Bldg., WASHINGTON, D.C.

You Need Power

Either for your own work or to fulfill that contract.



In either case you want power that can be absolutely depended upon—power that will respond to immediate needs and to every requirement.

You want power that is easy to control, that will save time and do the work right with the least trouble and expense.

THE I. H. C. Gas and Gasoline ENGINE

Furnishes just that kind of power.

The gasoline engine is universally recognized as the most economical and desirable source of power **when the engine is right.**

All we ask is an opportunity to prove to you that the I. H. C. gasoline engine is exactly right in every particular.

Let us show you why it will do all kinds of work more quickly, more steadily, more economically and with less trouble and attention than any other engine made.

The I. H. C. engine is simple, compact, easily kept in order and needs no expert or experienced man to run it.

It develops full rated horse power under the heaviest load, is absolutely safe and doesn't use a single charge more of fuel than the load requires.

Adaptable to Gasoline, Gas or Denatured Alcohol.

Made in the following styles and sizes:

Horizontal Engines:

Stationary 4, 6, 8, 10, 12 and 15 H. P.

Portable 6, 8, 10, 12, and 15 H. P.

Vertical,

2, 3, and 5 H. P.

Send for catalogue before installing any other power.

International Harvester Company of America

(INCORPORATED)

No. 7-B B Monroe St., CHICAGO, ILL.

Bedford Stone

BUFF AND BLUE

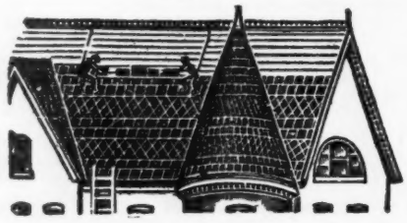
Sawed, Planed, Turned
Cut Ready to Set

Estimates promptly made for stone delivered to any point. Plans sent for estimate, promptly returned.

Bedford Steam Stone Works
Bedford : : Indiana

SLATE SLATE

GENUINE BANGOR



Roofing

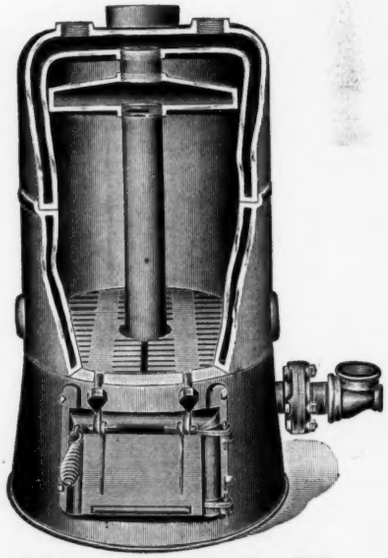
Blackboards

Structural

Write us before ordering elsewhere.

The Bangor Slate Co.

Miners and Mfgrs. **BANGOR, PA.**



BEST HOT WATER RESIDENCE HEATING BOILER MADE

Capacity of Heater nearly double without additional fuel by use of **Center Pipe** carrying water up through the center of deep fire pot. Heats from both sides.

T. L. PHILLIPS 12 FOX STREET AURORA, ILLINOIS

LORENZEN MANTELS

A Mantel in the home is useful as well as artistic and decorative. It saves you furnace heat on chill spring and autumn days, and diffuses cheer and comfort like no other piece of furniture in the house.

Lorenzen Mantels

$10 to $250

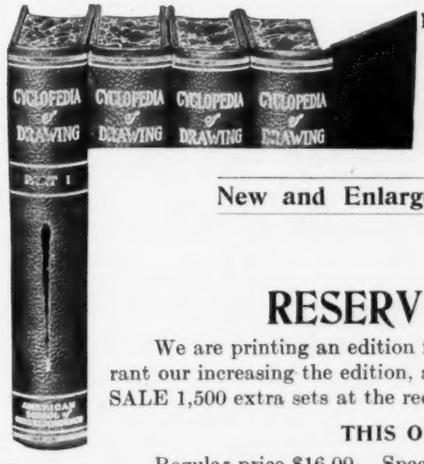
In Colonial, Craftsman, Modern Mission and numerous other styles, and all woods and finishes. Our modern factory, large stock of air-seasoned lumber and expert, skilled workmen all mean beautiful mantels, far above the ordinary. We are at all times prepared to furnish designs of Mantels and Fireplaces in the historic periods of architecture, such as Louis XIV, Louis XV, Louis XVI, Renaissance, Gothic, Rococo, Empire, Early English, Colonial, Chippendale, Sheraton, Adam, etc.

No. 468.—Modern Mission Style, 5 feet 11 inches high and 5 feet wide; heavy plan, shelves, recessed leather panels; the brackets supporting main shelf are carved with Spanish Insignia. Terra Vitrea tile hearth and facing. Hand-wrought Andirons of Romanesque design.

CATALOGUE FREE—Our new Book of Mantels, full of fascinating designs, reproduced from photographs, is now ready. It contains also illustrations in color, suggesting harmonious interior arrangements and decorations. Write for it today.

LORENZEN PAYS THE FREIGHT

CHAS. F LORENZEN & CO., Inc., **291 N. Ashland Avenue, Chicago**



Advance Subscription Offer

New and Enlarged Edition **Cyclopedia of Drawing**

Ready for delivery August 25, 1906

RESERVATIONS MUST BE MADE NOW!

We are printing an edition for our own use. To secure immediately a sufficient number of orders to warrant our increasing the edition, and thus reduce the cost of manufacture to us, we will offer in this ADVANCE SALE 1,500 extra sets at the reduced cost of production.

THIS OFFER IS MADE FOR IMMEDIATE ACCEPTANCE.

Regular price $16.00. Special advance subscription price good until Aug. 25th only $10.00, payable $1.00 now and $1.00 per month after books are delivered. If you wish the cash discount, send $9.00. Books will be shipped Aug. 25th, express prepaid, subject to five days' FREE EXAMINATION. Your advance payment will not obligate you to keep books. If unsatisfactory, notify us and your money will be promptly refunded.

The work consists of 4 volumes handsomely bound in ½ red morocco. It contains 1600 pages (7 x 10 inches) completely indexed, printed on special high grade paper, beautifully illustrated with our 1,200 illustrations, line drawings, half-tone engraving, full page plates, tables, formulae, etc. Our chief object in the sale of these books is to acquaint the public with the character of our instruction in drawing and to interest the people in the work of our school. The work is a comprehensive treatise and a complete Cyclopedia of information on drawing

BRIEF TABLE OF CONTENTS

Architectural Drawing, Architectural Lettering, The Roman Orders, Perspective Drawing, Shades and Shadows, Rendering in Pen and Ink and Water Color, Sheet Metal Pattern Drafting, Practical Problems for Sheet Metal Workers, Machine Design, Working Drawings.

American School of Correspondence
CHICAGO, ILL.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, ILL.

Enclosed find $1.00 for first payment on advance subscription sale of "Cyclopedia of Drawing," the balance ($9.00) I will pay in monthly payments of $1.00 each, beginning 30 days after receipt of books. It is understood that you will refund the $1.00 deposit if the work is not satisfactory.

*Name*_____

Address _____

Am. C. & B., 8-06.

PRACTICAL BOOKS

THAT TELL YOU HOW TO DO IT BY UP-TO-DATE METHODS

50 CENT BOOKS
NEAT CLOTH BINDING

Workshop Companion A Collection of Useful and Reliable Receipts, Rules, Processes, Methods, Wrinkles and Practical Hints for the Household and the Shop. By John Phin.

This is a book of 164 closely printed pages, forming a dictionary of practical information for mechanics, amateurs, housekeepers, farmers—everybody. It is not a mere collection of newspaper clippings, but a series of original treatises on various subjects, such as alloys, cements inks, steel, signal lights polishing materials and the art of polishing wood, metals, etc., varnishes, gilding, silvering, bronzing, lacquering and the working of brass, ivory, alabaster iron, steel, etc.

Easy Lessons in Architecture Consisting of a series of questions and answers explaining in simple language the principles and progress of Architecture from the earliest times. By Thomas Mitchell. Illustrated by nearly one hundred and fifty engravings. New edition.

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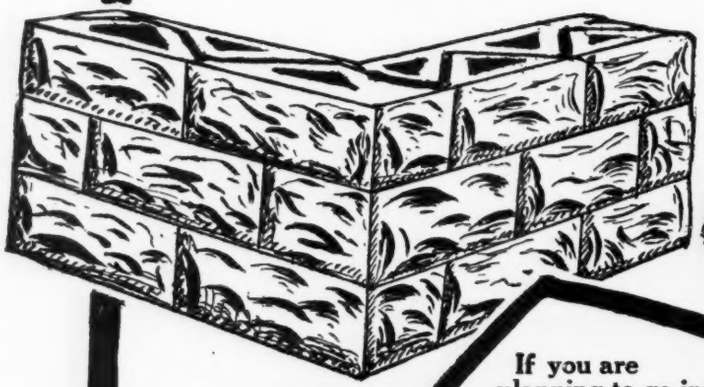

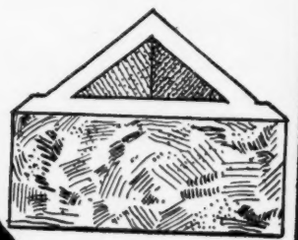

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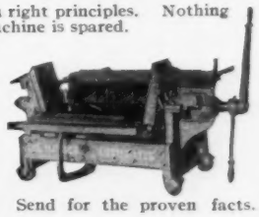

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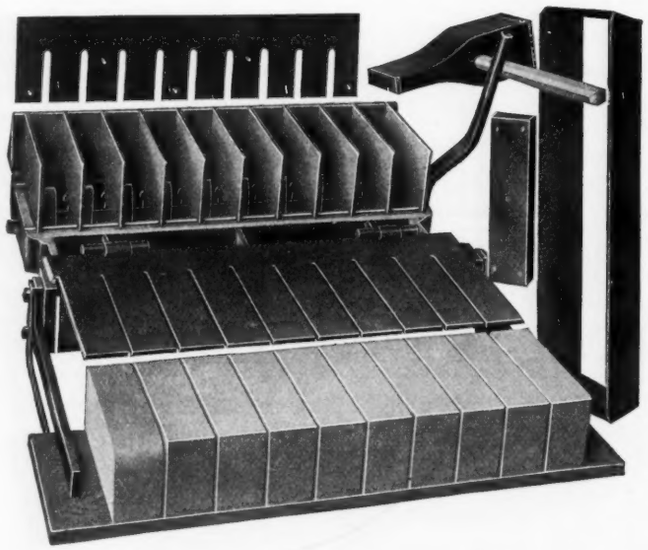

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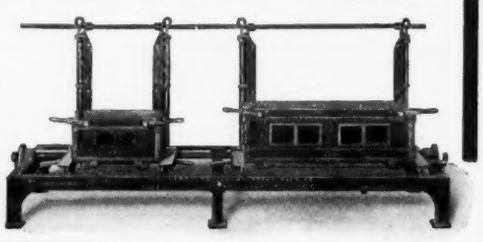

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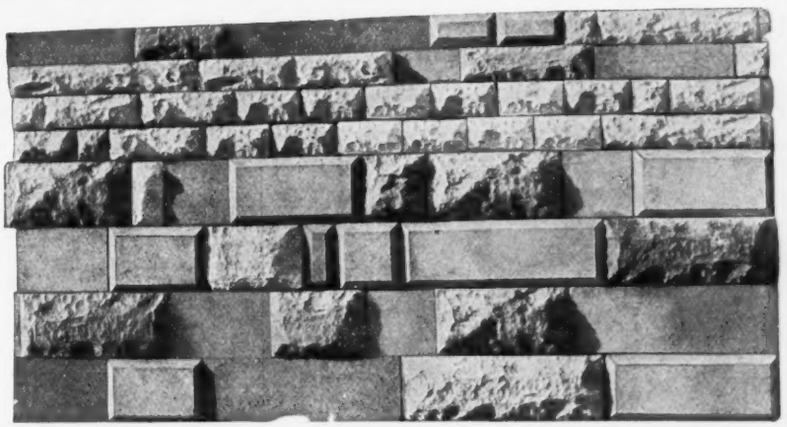

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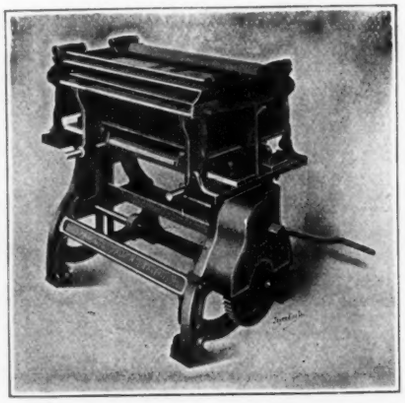

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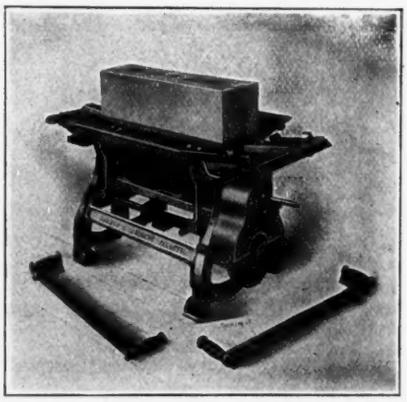

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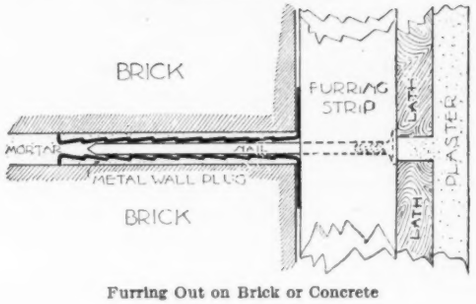

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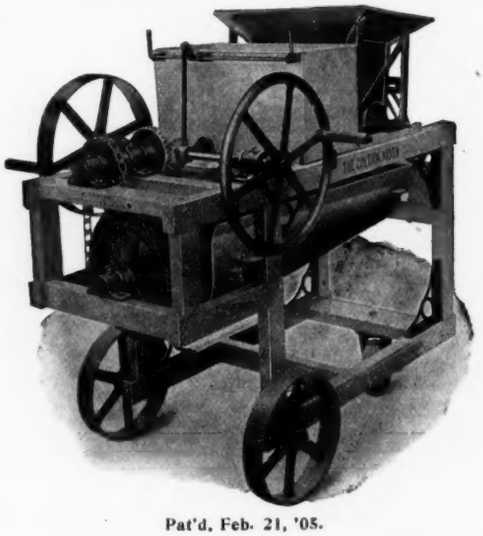

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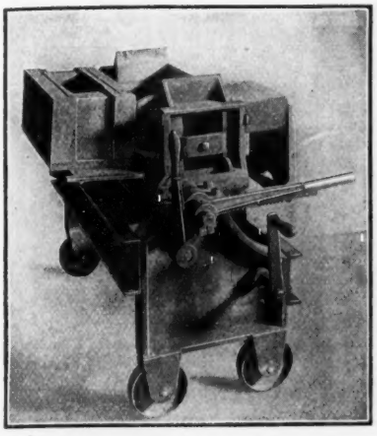

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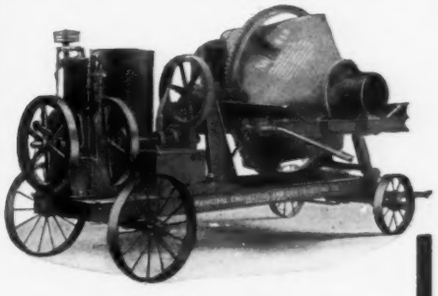
About Concrete Mixers



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for making concrete, mortar, pulp, briquettes, block fuel or any other requirement, the important question is—will it produce a perfect product?

Failing in this, any other features of claimed excellence are unworthy of consideration.

It stands to reason that concrete machines having for mixing devices paddles, scoops, shelves or blades attached to the inside of the periphery of the mixing receptacle merely pocket as much as they will hold of some ingredient as it enters the chamber and carry it around, cutting through but not mixing with the main mass of material at the bottom of the receptacle, and this ingredient, carried by these devices, is not removed, or mixed, until the batch is discharged.

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has no inside scoops or paddles—nothing but breaker rods, with an interior absolutely smooth and free from complicated mechanism.

At 15 revolutions a minute the entire contents of the cube are thrown back and forth and broken over the breaker rods 90 times—a more thorough mixing than is secured by any other mixer.

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As a mortar mixer it has no equal.

It is the only mixer which can be dumped by the same power that operates the machine. We control all patents covering this device.

There are no insides to clean, and no paddles, scoops or shelves to clog, wear out and get out of order.

It requiress less power to operate than any other mixer, consequently uses less coal and requires less labor.

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CONCRETE BLOCK MACHINE

PRICED COMPLETE, including Iron Pallets that will not warp, split or have to be replaced.

PRICE Well, this is attractive and will interest you.

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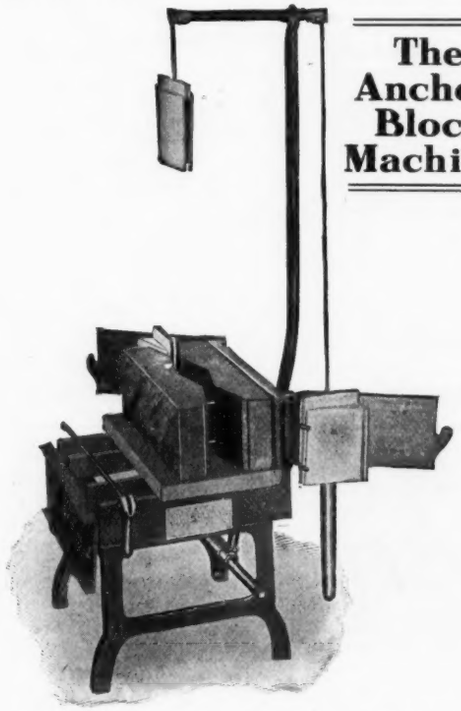

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IT WITHSTANDS

FIRE, FLOOD AND STORM

"Viewed from any standpoint, properly proportioned concrete withstands these elements better than any other material."–J. C. Ralston, Engineer, San Francisco.

WELL MADE CONCRETE BLOCKS ARE FIREPROOF

"IDEAL" BLOCKS ARE WELL MADE

Blocks made on the "IDEAL" MACHINE are conflagration proof up to the point of white heat. "Ideal" blocks resist the elements and live to the age of the pyramids. Let us tell you why, send for the details. Catalog R.

Ideal Concrete Machinery Co.

STATION 4 SOUTH BEND, IND.

Canadian Office and Factory

124 YORK STREET LONDON, ONT.

THE IMPROVED "MILES"

CONCRETE BUILDING BLOCK MACHINE

MOLDS ALL BLOCKS FACE DOWN

Makes circles, octagons, gables and water table blocks for hollow, solid or veneer walls.

Write us today for circulars and descriptive matter

THE P. B. MILES MFG. CO.

214 S. Mechanic St.

JACKSON, MICH.

For FIRE PROTECTION

USE

Refractory Concrete

So called because it is worked the same as cement or plaster, and will endure heat equal to fire clay products.

For flue linings, chimney blocks and tops, floor and partition blocks, conduits for electric wires, fire proof plaster for wood and metal lath, or as a scratch coat for stucco, this is the ideal material.

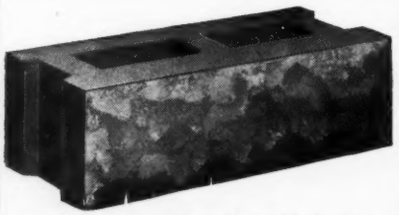
A finished product of this composition can always be had in less than twenty-four hours, this permits the formation of the product on the job, and to fit any requirement.

A ventilated flue or chimney from this composition is positively fire proof, and at the same time ventilates all rooms which it enters. Cheap to construct, and will meet the requirement of any size buildings.

Refractory Concrete will prove a profitable proposition for any concrete worker, contractor or builder.

For full information address

E. R. STOWELL : New Corydon, Ind.



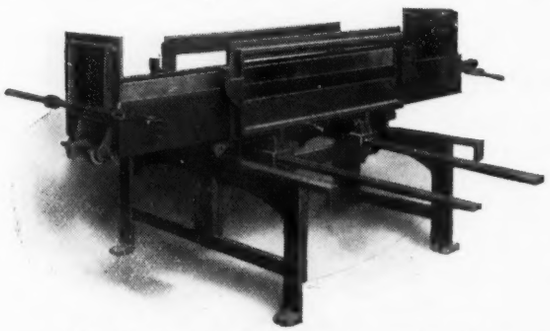
We Move the Machine NOT THE BLOCKS

Saves labor of off bearing, loss by damage; obviates necessity for heavy and expensive iron pallets. Reduces cost of plant and cost of operation. Every one knows that concrete should not be disturbed after it is molded or while it is setting, but this is the only machine by which this is possible. The blocks cost 6 cents to make—sell for 18 cents. One man can make 200 blocks per day. Whole outfit costs $125.00. Figure the profits.

Competition simply demonstrates the superiority of the Pettyjohn machine. Unlimited guarantee. SENT ON TRIAL

THE PETTYJOHN COMPANY

634 No. 6th Street, TERRE HAUTE, IND.



Machine with extension to make all long stone up to 5 ft.; 6 in. long

START RIGHT WITH FRANCISCO SYSTEM

The Francisco system is one of making blocks tamping on the face, using sand and cement for facing, cracked stone or gravel made wet for the balance of the block, which means dollars saved and better blocks, impervious to water. Do not stand in your own light, or let a penny hide a dollar. The side face machines are a failure. The quicker you start right the better.

MACHINE ON 10 DAYS TRIAL

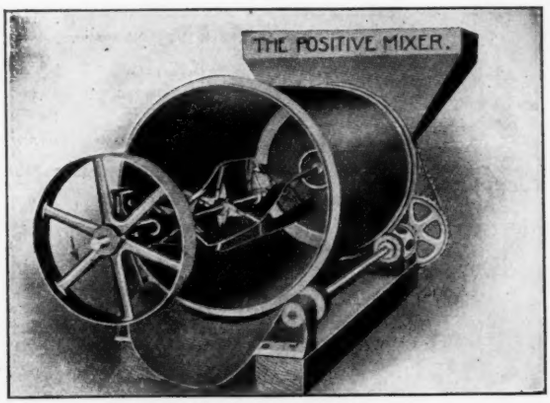
We will ship you a machine on ten days trial. The machine is a wonder. Makes all long stone desired up to 5 ft. 6 in. long. Circles, octagons, angles, chimney blocks, porch columns, veneered slabs, sewer tile, side walk blocks. Makes one 32 in. block or two 16 in. or 24 and 8 in. or 20 and 12 in. blocks together with sectional blocks at one operation, also 8, 9, 10 and 12 in. block for width of wall, all done from the adjustments on the machine, using wood pallets with iron core centers, making a saving in pallets alone sufficient to buy our entire outfit over and above the iron pallets. **Send for Catalog "G," showing six different sizes of machines. Prices range from $25 to $200. Also fence post machines. Agents wanted. Don't delay.**

THE FRANCISCO ADJUSTABLE BLOCK MACHINE CO.

358 N. High St., COLUMBUS, OHIO.

BETTER CONCRETE IS WHAT YOU ARE AFTER

The strength and durability of concrete is not in the amount of cement used, but in the way it is *mixed* with other materials. For that reason you should investigate



THE POSITIVE MIXER

This is not a tumbling barrel. The drum of the POSITIVE revolves in the opposite direction to the tumbling device, which is composed of parallel and angle blades, and the mixture is completed by an automatic sprinkling device at the outlet. It is self-cleaning, saves time and money, is automatic and positively mixes.

Send for Catalog "W"

THE JAEGER MACHINE CO., Columbus, O.

Showing Face-Down Position

THE LATEST 4 CONCRETE MACHINES IN 1

1. **A Face-Down Machine** — None equal it in advantages.
2. **An Upright Machine** — A marvel of speed, economy and wide range of adjustments.
3. **A Two-Piece Block Machine** — Exceedingly practical and makes two blocks at once.
4. **A Cement Brick Machine** — Meets all requirements.

So perfect and convenient is each phase that it operates as though made for each type alone. WONDERFUL in its AUTOMATIC FEATURES—ALL phases operated by ONE SIMPLE LEVER. THIS MACHINE received the GOLD MEDAL at the Portland Exposition over ALL competitors.

ANOTHER VALUABLE FEATURE

Its product makes the only triple air space wall. The latest and best thing out. Asolutely moisture proof.

The Winget Company furnishes all necessary machinery for a complete up-to-date Concrete Block Plant, including mixers and tampers. For full information address

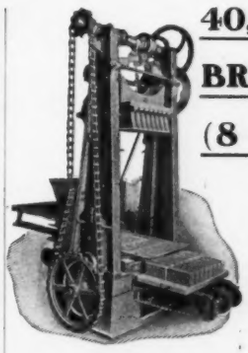
The Winget Concrete Machine Company, Columbus, Ohio

EUREKA

We have found it

Automatic, quick, and perfect operating concrete machinery.
Six kinds of block machines stationary and portable, side face and face down.
Four kinds of brick machines.
Two kinds of drain tile machines for small tile.
The best mold for round sewer pipe from 6 to 24 inches.
Reinforced three piece construction for large sewers, conduits, etc.
Fence post and sill machines.
Mixers and gas engines.
Send 25 cents for Catalogue and instructions on concrete work

THE BESSER MANUFACTURING CO.,
302 South Second Ave., Alpena, Mich.



40,000 SAND-CEMENT BRICK or 5,000 BLOCK (8 x 24) PER DAY

Only TAMPING principle power machine made.

We also make an up-to-date mixer.

Write for our Catalogue of power machines, also of our perfect bond-damp-proof block wall. (Hand moulds).

CONCRETE MACHINERY CO.
950 Majestic Building, DETROIT, MICH.

Hollow Concrete Walls and Partitions---Two Piece System

WHEN YOU FIND—That one piece hand tamped blocks make wet walls,
That such walls are not stone but cemented sand,
That damp sand and cement will not make true concrete,
That tamping damp sand displaces that already tamped adjoining,
That this produces a block lacking in density,
That you cannot safely plaster on such a wall without expense of furring,
That you have a soggy wet wall for days succeeding every storm,
That you have a wall with only thirty per cent of air space,
That you have no continuous horizontal air space,
That you have a wall with no cross bond,
That you have a system, requiring two men to handle a block and a derrick to put it in the wall,
That you have a system slow and laborious in manufacture and laying,
That you have no way of facing your work : (Patented)
Then write to—

THE AMERICAN HYDRAULIC STONE CO., Century Building. Denver, Colo.

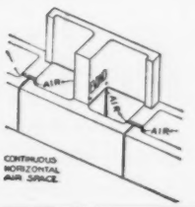
Ask for a prospectus describing the two piece wall containing the header bond, made of True Concrete, stronger in a 1 to 10 mixture than hand tamped damp sand and cement is in a 1 to 3 mixture. Every block made under heavy pressure, in steel moulds, in one set of which all the different widths of wall from 2½″ to 17″ can be made by simply changing the adjustment, making a wall 50% hollow containing an air chamber both in the horizontal and perpendicular, through which moisture, heat and cold cannot penetrate—a block easily handled by one man—to which any facing desired ¼″ thick is applied before the block is pressed; one thousand square feet of wall per ten hour day made, cured, and cared for with nine men—three times the daily product possible under any other system.

(Patented)

UNIVERSITY OF ILLINOIS Champaign, Ill., Sept. 29, 1904.

Gentlemen:— * * * I have, I believe, investigated all the principal systems of hollow concrete wall and partition construction now on the market, and have no hesitation in saying that your system of manufacturing is the only one I know of that obtains perfectly satisfactory results both in the block and in the finished wall.

Very truly yours, (Signed) JAMES M. WHITE,
Professor of Architectural Engineering.



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Best for mixing material for Building Blocks

Power machines of all sizes

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NATIONAL CONCRETE MACHINERY CO.
Security Building - - 188 Madison St., CHICAGO

The DUNN HOLLOW BLOCK MACHINE

COMPLETE in every detail. Especially adapted to the use of the Block manufacturer. Making blocks in all widths, lengths and many designs, including Sills, Lintels, PierBlocks,etc. PRICE $100

Masons & Builders Block Machine

MAKES blocks from 2 to 12 inches in width, up to 20 inches long in different designs. No expensive iron pallets required. A practical, rapid and economical machine for the Mason & Builder. No machine at any price makes better blocks or makes them more rapidly or economically. PRICE $40

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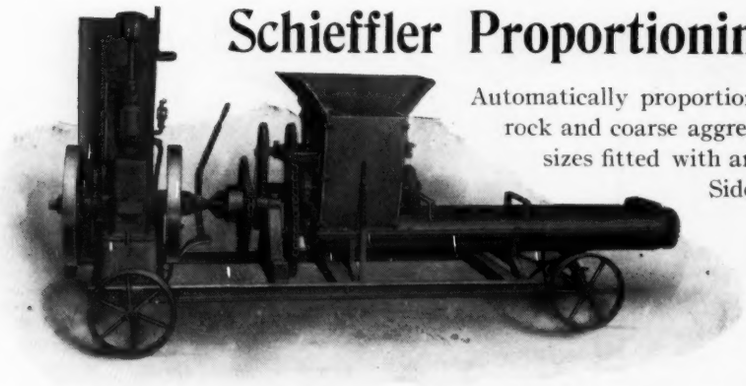

Schieffler Proportioning Continuous Mixer

Automatically proportions any three different materials, Crushed rock and coarse aggregates for large contract work. Made in all sizes fitted with any kind of power. For Street Paving; Sidewalk; Reinforced Construction, Block and Brick plants. There is no Mixer to equal it: A greater capacity and better mix with exact proportions and requires less amount of power than any other Mixer. All parts made extra heavy, strong and lasting.

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GET A MACHINE THAT WILL

DO THE BUSINESS

The cut of the church shows what can be done with the Stewart Machine, as this church was erected of blocks made on a Stewart. You can make blocks in any old box, but if you want to make good blocks,

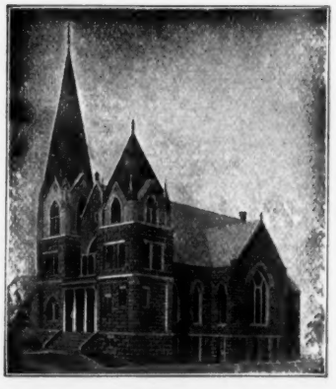
GET A STEWART

Write for catalogue to the

STEWART CEMENT BLOCK MACHINE CO.

888 Lafayette Block, WATERLOO, IOWA

The OHIO CERAMIC ENGINEERING CO., Cleveland, Ohio
Agents east of Wisconsin, Illinois and the Mississippi River.



HIGH-GRADE CONCRETE MACHINERY

We have the **Leaders**—"9 of them"—**Normandin, Cemaco, Peninsular** and **Champion Block Machines** (2 side face, 2 face down); **Favorite Concrete Brick Machines**, with mechanical tamper, big demand; **Systematic Mixer**, mixes sand-cement dry, then wet, any proportion, very popular; **Universal Post Machines, Ornamental Ball-Base Baluster Molds, Practical Sill Cap Molds.**

We are in the business, responsible, started 1900, have world-wide reputation, square dealing and practical machinery. Products of our machines in demand because they are displacing clay brick, stone, lumber everywhere for superior excellence in modern building construction. Our machines received highest awards, St. Louis, 1904, Portland, 1905. Also adopted twice by U. S. Govt. We can please you. Write

CEMENT MACHINERY CO., Russell Bldg., Jackson, Mich.

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Only and Original Material for Making Walls Damp Proof and Stain Proof.

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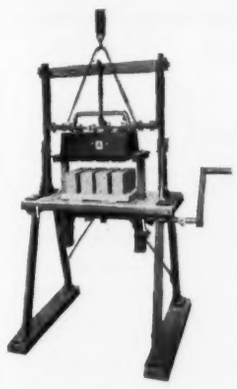


Emery Cement Brick Machine

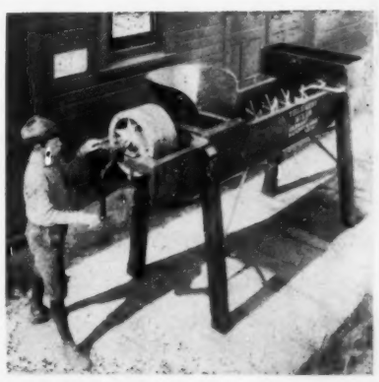
The Emery Cement Brick Machine

THE "TAMPING" PROCESS

There is but one way to make a perfectly sound Cement Brick, and that way is by the **tamping** process. Tamping excludes the air, leaving the Brick Solid to the core. Tamping is our process. Results: Solid Brick, Sound Brick, Brick that are perfectly square and all of exactly the same size. No material handled the second time. Each mold holds just enough material to make a perfect brick, no more, no less. Every moment with our machine accomplishes something.

Three men 10 hours 6,280 perfect Brick. Ordinary daily output 5,000. We prove our claim. Positively no machine on earth is as well adapted for making cement Brick. Cement Brick are the most durable that can be made. You probably would like our catalogue.

Emery & McKerlie
301 E. Jane St., Bay City, Mich.



Emery Mixer

NOT BETTER THAN THE BEST

BUT AS GOOD AS THE BEST

WE KNOW that the block made on the Coryell Machine will make a dry inside wall, because they have been tested out the past winter.

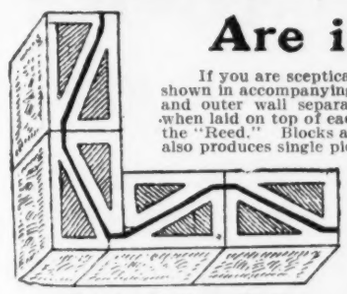
The Machine is Right
The Block is Right, The Price is Right

We give you more for your money than you can buy anywhere. We have placed a large number of these machines the past season, and all are giving the very best satisfaction. We make the price right, because we sell direct to the customer, saving all salesmen's commissions, and give the purchaser the benefit. Ask and you shall receive a catalogue.

Manufactured by **KELLS FOUNDRY & MACHINE COMPANY**
ADRIAN, MICH, U. S. A.

The Reed Machines

Are in the Lead



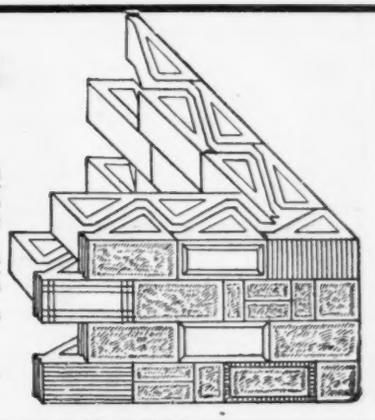
Triple Hollow Wall

If you are sceptical as to dry walls from concrete blocks, examine the wall shown in accompanying cut; it settles the question. Continuous air space, inner and outer wall separate. Look at the bondage, stronger than any other blocks when laid on top of each other. *Two* blocks produced at the same operation on the "Reed." Blocks are hollow which lays up a triple hollow wall. The "Reed" also produces single piece blocks. All machines adjustable.

The "Reed" has the advantage of a stationary mould box which admits of the use of a wetter mixture of material. *All other* machines are taken away from the blocks and brick.

Let us tell you more about it. If interested write us at once as others are doing.

The Wichita Coal and Material Co.
Wichita, Kansas



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HAND AND FOOT-POWER
MACHINERY

Our No. 7 Scroll Saw is warranted to be made of good material and workmanship, and to saw pine 3 inches thick at the rate of one foot a minute.

Send or Catalogue.

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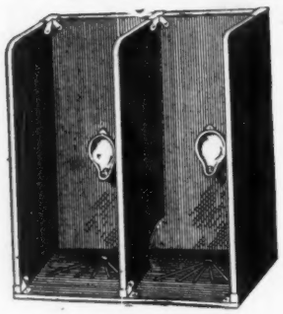

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The American Mixer Mixes Anything

The American Mixer is built for the practical contractor, for any work in the mixing line that he may require. The revolving plows inside the drum do the work, dividing and blending the aggregates, whether mortar, plaster, cement finish or top coating of any kind, and you do not have to rely on the simple rolling of the materials down the side of the drum, as in the old style revolving drum mixers. They are superficial at best. The American does the work thoroughly, whether the mix is dry, medium, or wet — fine or coarse. Our catalog tells all about it.

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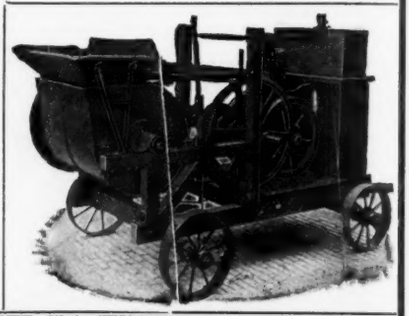

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These three great labor saving machines are unequalled in economy, practicability and efficiency

The X-L Stone Machine can be operated by a boy. None speedier. Makes a variety of over 1000 blocks, which form all width walls over 2 inches four thickness of veneer blocks. 3-4½-6 and 9 inch heights. 2-3-4-5-6-7-8-9-10-11-12 14-16-18-20 and 24 inch lengths. Circles, Panels, and from 20 to 64 degree angles.

Outfit furnished will make more than any four other machine outfits of same price.

Our Off-Bearing Car saves one-half of time and labor in removing blocks.

Our Automatic Truck (lever movement) a boy can handle, unload and load 8 to 12 blocks in one-eighth of the time required by two men in the old way.

Dry Inner Wall without the use of expensive facings or washes.

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BE YOUR OWN BRICK MAKER

LARGE CAPACITY — 5,000 BRICK PER DAY
SKILLED LABOR UNNECESSARY. SIMPLE AND INEXPENSIVE

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This Watch Guaranteed

A Watch Without Cost

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Movement Regular sixteen size, and only three eighths of an inch in thickness. Lantern pinions (smallest ever made). American lever escapement, polished spring. Weight, complete with case, only three ounces. Quick train---two hundred and forty beats a minute. Short wind; runs thirty to thirty-six hours with one winding. Tested, timed and regulated. This watch is guaranteed by the maker for a period of one year.

The Guarantee In every watch will be found a printed guarantee, by which the manufacturers agree that if without misuse the watch fails to keep good time within one year they will repair it free of charge, and return it.

DESCRIPTION--Plain center band, elegant nickel case, snap back, Roman dial, stem wind, stem set, medium size, oxydized movement plate, open face. *Engraved front and back.*

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Send us your name and address on a postal card to-day,
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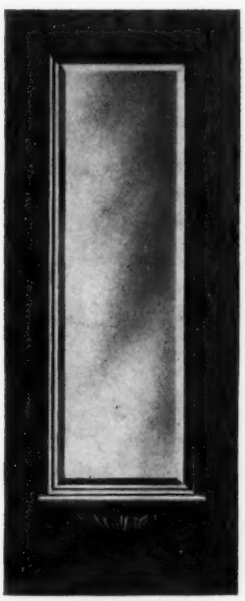

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It presents a glossed surface, similar to porcelain, will not peel or flake, is **odorless and absolutely sanitary.** We have manufactured it for three years, and it has been accorded general praise and highest commendation.

This is only one of our line of Refrigerators. Send for Circular No. 66 for other designs.
Cut shows Galv. Steel linings.
Can be furnished also in White Enamel Lining.

No.	Dimensions, Ins.	Ice, Lbs.	Weight, Lbs.	Lining	Prices
C 2903	38x22x50	160	230	White Enamel	$27.70
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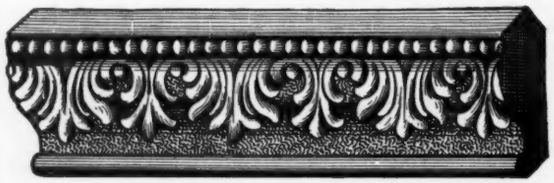
Grille C-1910-$49.00
See catalog for size of this grille and various other designs.



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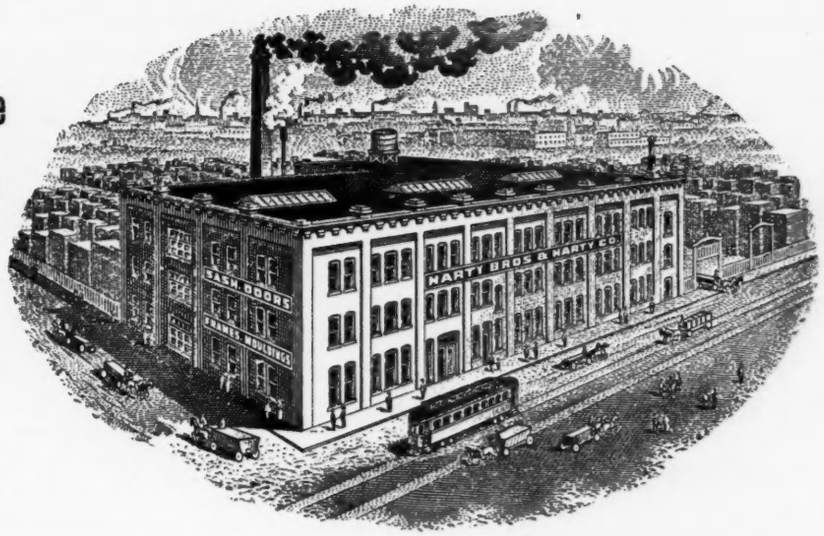

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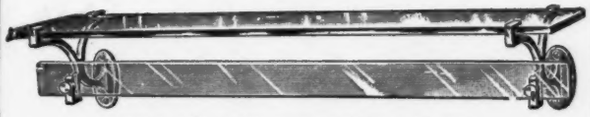

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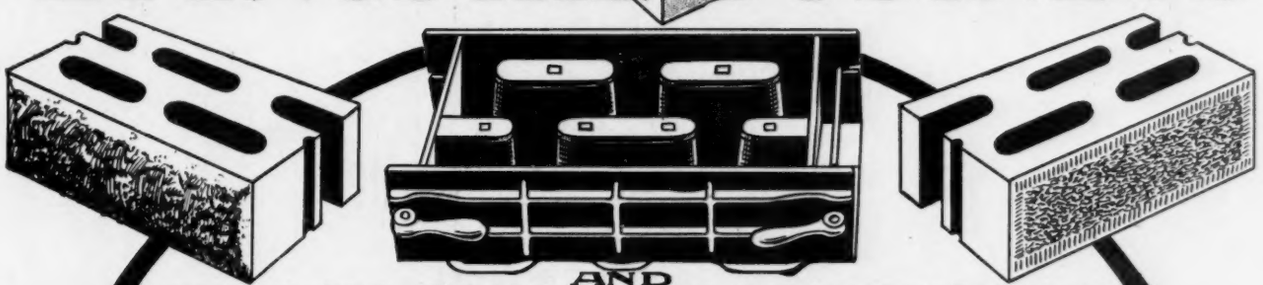

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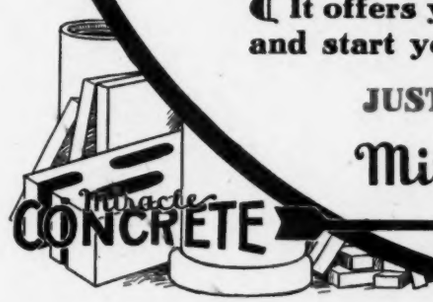

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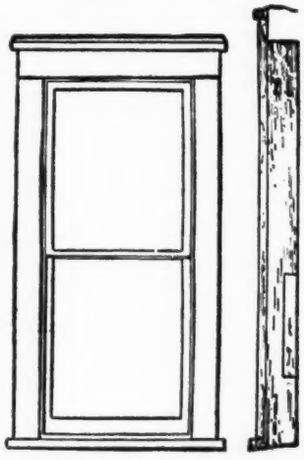

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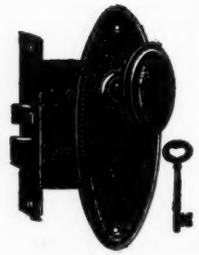

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